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ABSTRACT

This report is one of three publications from the task analysis study of ornamental horticulture conducted at Cornell University. It was designed to develop a procedural model for task analysis in the area of agribusiness. The personal interview method was used to collect data from businesses within nine identified areas of ornamental horticulture. The testing of the task analysis model resulted in the development of a validated list of tasks for each of the nine business areas, and provided detailed data for each of the individual tasks. Related documents, based on this same study, are available as VT 016 042 and VT 016 170 in this issue. (GEB)

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A MODEL FOR TASK ANALYSIS IN AGRIBUSINESS

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James W. Legacy

June 1972

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FOREWORD

This report is one of three publications from the task analysis study of ornamental horticulture conducted by Staff in Agricultural and Occupational Education, College of Agriculture and Life Sciences at Cornell University.

The procedural model used to conduct the task analysis research is described in this report. The second report, An Analysis of Tasks Performed in the Ornamental Horticulture Industry presents the detailed task data output from the task analysis. The final report, Using Task Data for Recruitment of Workers in Ornamental Horticulture: Report of a Field Test details the findings on the use of task data in worker recruitment. Readers with interests specific to the horticulture industry should refer to these latter two publications.

The area of study in this task research was the ornamental horticulture industry in New York State. However, the procedures used in this analysis may well be applicable for task analysis in other areas of agribusiness in several states.

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CHAPTER I

INTRODUCTION

The production of food and fiber has evolved from a primarily self-sufficient production agriculture to a highly mechanized and specialized industry requiring increasing input and output services. Today's farmer may have his cows bred by a specialist, his soil tested in a laboratory and his business records analyzed by a computer. Processing and distribution of farm products may involve processing of a single product into several forms for consumers. Controlled storage facilities now make possible year round availability of seasonal products. Consumer demand for conveniently packaged and "ready to serve" foods has further increased the need for processing and distribution services.

All businesses providing inputs of production, processing, and distribution of agricultural products are defined as agribusiness.[1]

The Need for Trained Workers in Agribusiness

The increasing technology of agribusiness requires a corresponding increase in the training level of agribusiness workers. At the same time the rapidly growing array of businesses and industries providing supply, and processing and distribution services to agricultural production requires trained workers to be available in increasing numbers. Also within this melieu there is increasing competition from other industries for trained manpower. With our well developed transportation system it is not uncommon for workers to commute considerable distances to jobs in industrial areas while maintaining residence in suburban or

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1. Davis, John H. and Ray A. Goldberg. A Concept of Agribusiness. Harvard Business School, Division of Research, Boston, 1957, p. 2.

rural areas. Geographic proximity as a limiting factor for employment has been considerably reduced. Agribusiness employers must be as sophisticated in their recruitment and employment management skills as their competitors, if they are to successfully compete for trained workers.

Matching Workers and Jobs

The New York State Employment Service through its Rural Manpower Representatives has a history of success in identifying and recruiting workers in agribusiness. Yet, in situations of high unemployment and unfilled labor shortages, jobs still exist in many areas of agribusiness. While some of the disparity may be accredited to low wage rates and seasonality of some agribusiness work, Taylor, et.al. identified the need for improved procedures to recruit and retain workers for agribusiness.[1] Smaller supplying and production firms in particular had limited, if any, organized recruitment policies and procedures. This indicates the need for use of proven and/or new approaches to recruitment that will match qualified workers with available agribusiness jobs.

Studies of worker qualifications essential for employment in this occupational complex have been confronted by such problems as: (1) employment conditions under which specific jobs cut across a number of traditional occupational titles, (2) employment information stated as general competencies and lacking the specificity needed to bring the appropriate manpower and jobs together, and (3) a lack of clearly

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1. Taylor, Lee and J. Paul Leagans, Workers in Agribusiness, Cornell University Agricultural Experiment Station, New York State College of Agriculture, Ithaca, New York, 14850, March, 1970, p. 73.

identified job clusters which reflect the needs of the industry, provide for occupational change, and occupational choices.

The preliminary identification of tasks and job titles in the original Taylor and Leagans[1] study indicates that the actual tasks performed by workers in agricultural occupations need to be described in a taxonomic way and in behavioral terms if agricultural employment and employment opportunities are to be identified. Recruitment instruments which identify the tasks can then be constructed to provide a valid basis for optimal recruitment and selection of both advantaged and disadvantaged workers for jobs.

Rationale for Use of Task Analysis Through the Functions-Task Approach[2]

The Functions-Task theory is an approach to the study of work performance. This approach involves identification of the functions performed somewhere in the industry, and identification of the tasks important to the performance of the identified functions. The identified functions and tasks may then be used as a basis for the development of a recruitment procedure. In the discussion of the rationale for use of functions-task analysis that follows, examples are taken from the ornamental horticulture industry which was the area of agribusiness selected for testing the procedural model. The criteria for selection of ornamental horticulture are described in Chapter III.

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1. IBID., pp. 123-129.

2. Berkey, Arthur L. The Importance of Activities Performed in Functions of the Farm Machinery Industry as a Basis for Training Programs. Thesis, Doctor of Philosophy, Michigan State University, East Lansing, Michigan, 1967. pp. 8-12.

Ornamental Horticulture firms within each business area vary greatly in size, organization and number of employees. However, they serve essentially the same purpose regardless of their diversity, e.g. to provide floral products at the retail level (retail florists), or to provide tree services (arborists services). As firms of an ornamental horticulture business area have similar purposes, the functions of the business, and the tasks performed to fulfill these functions, are essentially the same. Identification of functions and tasks that are common to ornamental horticulture business areas through the use of the functions-tasks theory can provide a basis for the development of a worker recruitment procedure for these firms.

The functions-tasks theory used in this study is in contrast to the job title approach where under the latter a study is made of the activities a worker is required to perform in a given job. The functions-tasks theory is used in this study instead of the job title approach for the following reasons:

1. Using the job title approach presents the problem that the combination of activities performed in any employees job is highly dependent on the firm variables of organization, size and number of employees. Also, titles for the same job may vary from firm to firm. This variation both in the activities performed in a given job title,[1] and in job titles for the job, may limit the usefulness of the job title approach for the development of a recruitment instrument with broad application to the ornamental horticulture industry.

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1. Clark, Raymond M. Vocational Competencies Needed for Employment in the Feed Industry. Educational Research Series, Number 22, East Lansing, Michigan: Bureau of Educational Research Services, College of Education, Michigan State University, January 1965. p. 1.

2. As technical change continues at an increasing rate, new tasks will need to be performed to meet this change. Under the job title approach, this may result in new, or revised job titles, although not all the tasks performed under this new or revised title may be new. This continued need for new, or revised job titles may result in problems of definition, keeping job classifications current, and updating the recruitment instrument used by employers and employment agencies. Using the functions-tasks theory as an approach, tasks may be added or deleted as there is a change in their importance to the performance of the functions. The name of the function can remain the same, avoiding the problems of definition and revision of classifications.

Using the functions-tasks theory as an approach has the advantage that the task analysis procedure will ask employers to identify tasks that are actually performed. This is in contrast to approaches involving the identification of competencies in functions[1] where the competency identified may include the ability to perform a varied number of tasks depending upon how the competency is worded. In order to identify the tasks in competencies required to perform a function, it is first necessary to define the competency in terms of what an individual trained in that competency can do, i.e. what tasks can be perform. Then the tasks performed in a function can be identified. By using the functions-tasks theory, which focuses directly on tasks in relation to functions, the intermediate step of defining competencies in terms of tasks is avoided.

The functions-tasks theory applied through task analysis offers

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1. Gleason, William E. Functions of Industry Approach to Curriculum: A Study of the Retail Farm Machinery Industry. Unpublished Ph.D. dissertation, College of Education, Michigan State University, 1967. p. 14.

the possibility for identification of tasks common to functions within one or more occupations. These common tasks may be used to provide a basis for development of core training programs with broad application to families of occupations.

In summary, despite differences in size, or organization and number of employees, firms in an ornamental horticulture business area serve essentially the same purpose. Because these firms have a similar purpose, the functions and the tasks performed to fulfill these functions, are also similar. The functions-tasks theory avoids the job title approach problems of varied tasks performed under the same job title and variation in job title for the same job. Problems of definition of job titles, keeping job titles current and updating recruitment instruments resulting from technological change are also avoided. By focusing directly on tasks, the functions-tasks theory avoids the intermediate step of defining competencies in terms of tasks. Using this theory as an approach also offers the opportunity for identification of tasks common to the performance of functions in one or more occupations which may form the basis for the development of recruitment instruments and training programs with broad implications.

The Parent Study

In 1968-1969 a research team from the New York State College of Agriculture at Cornell University, sponsored by the Division of Employment, New York State Department of Labor, combined efforts to study agribusiness firms and workers. Their efforts were confined to a nine county area, including and surrounding Rochester, New York. The report of the study, entitled Workers in Agribusiness, involved the construction of a

profile of firms and workers, an analysis of images of agribusiness, a study of recruitment practices and occupational mobility. The Workers in Agribusiness study treated the subject of occupations in agribusiness, suggesting that, general job descriptions may not be of much value in recruitment[1] and the need for continued research in worker recruitment.[2]

On July 15, 1970, Division of Employment funding was extended to a research project designed to analyze the Ornamental Horticulture area of Agribusiness. The objectives of this overall study are as follows:[3]

1. To develop a procedural model for task analysis in agribusiness.
2. To identify and analyze tasks in qualitative and performance (behavioral) terms in a selected sample of ornamental horticulture agribusiness establishments.
3. To classify tasks identified as to those needed for entry level employment, and those which are customarily learned on the job.
4. To develop occupational profiles (lists of tasks) in the agribusiness occupation studies which may be used as an instrument for recruitment of workers, as the technical competency consideration

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1. Taylor, Lee and J. Paul Leagans. Workers in Agribusiness, p. 146. Cornell University Agricultural Experiment Station, New York State College of Agriculture, Ithaca, New York, March 1970. 238 pp.

2. IBID., p. 156.

3. Bauder, Ward W., William E. Drake, and Arthur L. Berkey. Task Analysis and Recruitment in Agribusiness, Cornell University Agricultural Experiment Station, Supplemental Research Proposal By: Rural Sociology Department, Education Department, 1969. p. 2.

in worker promotion, identification of tasks which disadvantaged persons may successfully perform, and counseling of students for entry into agribusiness occupational training programs.

5. To develop preliminary guidelines and procedures for future testing of the instrument developed in (4) above.

This report will be limited to that part of the study involving the development of a model for task analysis which will meet the first three objectives of the research project.

Purpose of the Study

This study is designed to develop a procedural model for task analysis in the Ornamental Horticulture area of agribusiness. It is hoped that future research will show that this model may be adapted for task analysis in other areas of agribusiness.

Objectives of the Study

The following specific objectives are prerequisites to meet the purpose of the study:

1. Identify the study area
2. Construct the data collection instrument
3. Identify the population
4. Sample from the population
5. Determine data collection procedures
6. Collect data
7. Analyze the data
8. Construct the revised model

Assumptions and Limitations

The scope of the study includes task analysis of all business areas of ornamental horticulture. The model assumes sufficient similarity between the various business areas to warrant the application of a common research method.

It is assumed the Cooperative Extension personnel are qualified to select ornamental horticulture employers for interview.

Definition of Terms

The following operational definitions are used for this study:

1. Agribusiness -- All businesses providing inputs, producing, processing, and distributing agricultural products.
2. Ornamental Horticulture -- Services and/or products of decorative or recreational nature, not for food or fiber.
3. Ornamental Horticulture Business -- A commercial unit receiving more than 50 percent of its gross income from the sale of ornamental horticulture products or services, and employing full-time and/or seasonal workers.
4. Handicapped -- Persons with academic, physical, and/or emotional handicaps.
5. Function -- The operations that must be performed somewhere in the total business or industry in order for it to be successful or to continue to operate. It denotes a relatively precise process performed to achieve an outcome which is essential to the whole, in terms of overall purpose of the industry.[1]

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1. Clark, Raymond M. and Donald O. Meaders. Function Approach to Identifying Curricular Content Approach to Vocational-Technical Education Programs. College of Education, Michigan State University, 1968. p. 1.

6. Task -- Any group of activities performed at about the same time or in a close sequence, and sharing a common work objective.[1] A logically related set of actions required for the completion of a job objective -- a complete job element.[2]

7. Business Area -- Any group of businesses having distinct physical characteristics which separate them from other businesses of their industry. The business areas identified in ornamental horticulture are: Retail Florists, Farm and Garden Stores, Landscape Services, Greenhouse Production, Nursery Production, Arborists Services, Turf Production, Wholesale Florists, and Golf Courses.

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1. Glazer, Robert. Training Research and Education. John Wiley and Sons, Inc., New York, 1965. p. 32.

2. Mager, Robert and Kenneth Beach. Developing Vocational Instruction. Fearon Publishers, Palo Alto, California, 1967. p. 10.

CHAPTER II

REVIEW OF LITERATURE

A review of the literature was made to serve as both a prelude to the actual study of the ornamental horticulture industry and as a guide to research techniques. The main sources of past works were, Summaries of Studies in Agricultural Education;[1] Educational Resources Information Center -- A Resource for Vocational and Technical Education;[2] and The Agriculture Education Magazine.[3]

An extensive search was made to locate studies concerned with developing procedural methods of analyzing agriculture business. Many works were found that investigated agriculture business but none that presented the method of investigation as their theme. For this reason it was necessary to review studies exploring various areas of agribusiness with the purpose of examining the procedural methods used. Since Ornamental Horticulture was the area selected for study, much of the literature reviewed deals with this area of agribusiness.

Research in Ornamental Horticulture

Kumpf[4] studied the demand for ornamental horticulture training

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1. Summaries of Studies in Agriculture Education, U.S. Department of Health, Education, and Welfare; Office of Education, U.S. Government Printing Office, Washington 25, D.C.

2. Educational Resources Information Center, A Resource for Vocational and Technical Education, ERIC Clearinghouse, The Ohio State University, 1900 Kenny Road, Columbus, Ohio.

3. The Agriculture Education Magazine, The Lawhead Press, Inc., 900 East State Street, Athens, Ohio.

4. Kumpf, William A. The Place of Ornamental Horticulture in New York State. Thesis, Master of Science, Cornell University, Ithaca, New York, 1950. 58 pages.

at the high school level. By letter and mailed questionnaire, he solicited opinions from; teachers of ornamental horticulture, principals and administrators of secondary schools, and businesses engaged in ornamental horticulture. He identified the ornamental horticulture population as those businesses belonging or holding associate membership with ornamental horticulture trade organizations. Kumpf sent 530 questionnaires to commercial flower growers, 886 to retail florists and 150 to nurserymen. The response to the mailing technique varied from 11 percent of the retail florists and nurserymen to 16 percent response by commercial flower growers. It is interesting to note that the Kumpf maintained separate categories for greenhouse producers (commercial flower growers) and nursery producers (nurserymen).

In a study by Walter[1] a selected group of ornamental horticulture businesses were asked to respond to a list of 36 specific areas of knowledge. The manager or owner presented his view of training needs in each of these areas of knowledge. The need was classified with the use of 5 skill levels varying from unskilled to consultant. The study area was confined to a two county area of Maryland. The questionnaires were field tested with personal interviews and actual data collection was completed with mailed questionnaires. A preceding telephone call asking for the businessman's help was a prerequisite to his inclusion in the mailing list. Telephone screening combined with 2 follow-up letters to late respondents resulted in a 100 percent return from 67 businesses. Although not clearly stated, it appears that the sample included all businesses in the two county area that were willing to

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1. Walter, John C. A Study of the Occupational Opportunities and Requirements in Ornamental Horticulture in Montgomery and Prince George's Counties, Maryland. Thesis, Master of Science, University of Maryland, College Park, Maryland, 1963. 115 pages.

respond. The excellent response to a complex mailed questionnaire appeared to result from selection of cooperative businesses, careful instrument planning and personal interview pretesting.

In 1966, Dillon[1] made use of the personal interview technique in determining that separate and specialized agriculture courses were needed for workers in ornamental horticulture. By random sampling, 160 workers were asked to assign values to a list of 100 items of knowledge.

In uncovering "Competencies Needed by Teachers of High School Ornamental Horticulture Courses," Bass[2] constructed a list of 96 competencies. He used the opinion of experts in Education and Ornamental Horticulture in formulating the list of competencies. A group of 18 experts formed a jury. The jury evaluated each competency as to the extent to which it is needed as a part of high school curriculum. The jury was consistent in its selection of essential competencies and did not add competencies to the list presented. The careful preparation of competencies through the use of experts seems to be at least one practical explanation for jury agreement.

Research in Other Areas of Agribusiness

Berkey[3] in 1967, studied selected functions of the farm

1. Dillon, Roy D. Comparison of Certain Abilities Needed by Workers in Licensed Nurseries and Licensed Ornamental Horticulture Businesses. Thesis, Education Department, University of Illinois, Urbana, Illinois, 1966. 255 pages.

2. Bass, B. C. Competencies Needed by Teachers of High School Ornamental Horticulture Courses. Research Division Bulletin 23, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1970. 50 pages.

3. Berkey, Arthur L. The Importance of Activities Performed in Functions of the Farm Machinery Industry as a Basis for Training Programs. Thesis, Doctor of Philosophy, Michigan State University, East Lansing, Michigan, 1967. 173 pages.

machinery business. A large part of this study concentrated on building a list of activities within each functional area. The importance of each activity was judged by a 21 man panel. The panel was composed of an equal number from each of the following groups (1) retail dealership managers, (2) industry advisors representing farm machinery instruction, and (3) educators concerned with training of industry personnel. It should be noted that careful articulation of the activities within each function may have lead to a sound instrument as very few activities were added by the jury of experts.

The publication Workers in Agribusiness by Taylor and Leagans[1] approached the area of occupations through job descriptions. Findings indicated that in many cases job titles varied from conventional Dictionary of Occupational Title classifications. One example cited employers ranking 25 job titles as professional, while the D.O.T. granted only 15 of these jobs a professional ranking.[2] The whole area of job titles seemed an inadequate means of relating needed or performed skills. Reporting in terms of skills and conditions of performance seems a more appropriate method of relating what a worker does.

Summary of Literature Review

Agricultural Educators have sought solutions to a great variety of problems through analysis of agricultural business. This review identified three procedures of studying agriculture business: (1) the mailed questionnaire; (2) presenting the questionnaire in a

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1. Taylor, Lee, and J. Paul Leagans. Workers in Agribusiness. Cornell University Agricultural Experiment Station, New York State College of Agriculture, Ithaca, New York, March 1970. 238 pages.

2. IBID. p. 123.

personal interview; and (3) the use of a jury of experts to complete questionnaires. The studies represented examples of varying degrees of instrument planning and organized sample selection.

The review provided a picture of various means of analyzing agricultural business in formal investigations. Thus providing a starting point in developing the procedure and instrumentation for the ornamental horticulture task analysis study.

CHAPTER III

THE TASK ANALYSIS MODEL

Introduction

The literature review of agribusiness suggests that the development of such a model will be unique. Since the purpose of this study is the development of a procedural model, it should be kept in mind that the specific results of the ornamental horticulture task analysis are presented only to evaluate the task analysis model used and not as an end in themselves.

Planning Using the PERT Technique

The Program Evaluation and Review Technique (PERT)[1] was used to plot the expected course the research would follow. This procedure is most helpful in anticipating project needs. The PERT chart used in the ornamental horticulture study is presented here to serve as an illustration of the application of that PERT technique and a guide to the major steps used in the study. (See Figure I)

Steps in Defining and Sampling the Population

Selection of the Industry to be Examined

The area of ornamental horticulture agribusiness was selected for study by the research team for the total project of which this study is a part.[2] It is hoped that the procedures which work well in ornamental horticulture will also be applicable in analysis of areas of agribusiness.

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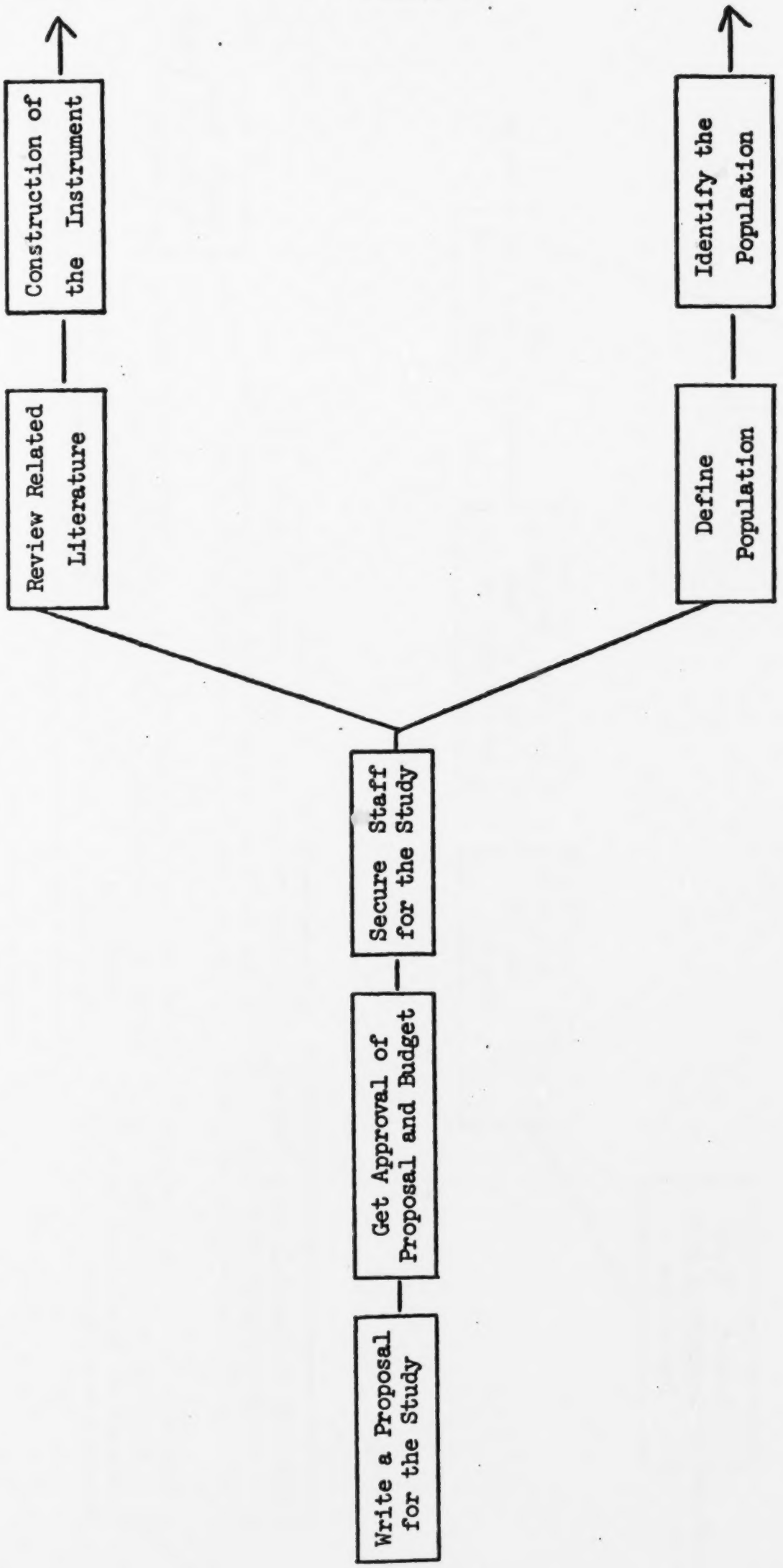
1. Cook, Desmond L. Program Evaluation and Review Technique Applications in Education. U. S. Department of Health, Education, and Welfare Office of Education, Washington, D. C., 1966. 100 pages.

2. See pp. 6-7 of this report.

FIGURE I


Review Related Literature
Construction of the Instrument
Define Population
Identify the Population
Write a Proposal for the Study
Get Approval of Proposal and Budget
Secure Staff for the Study

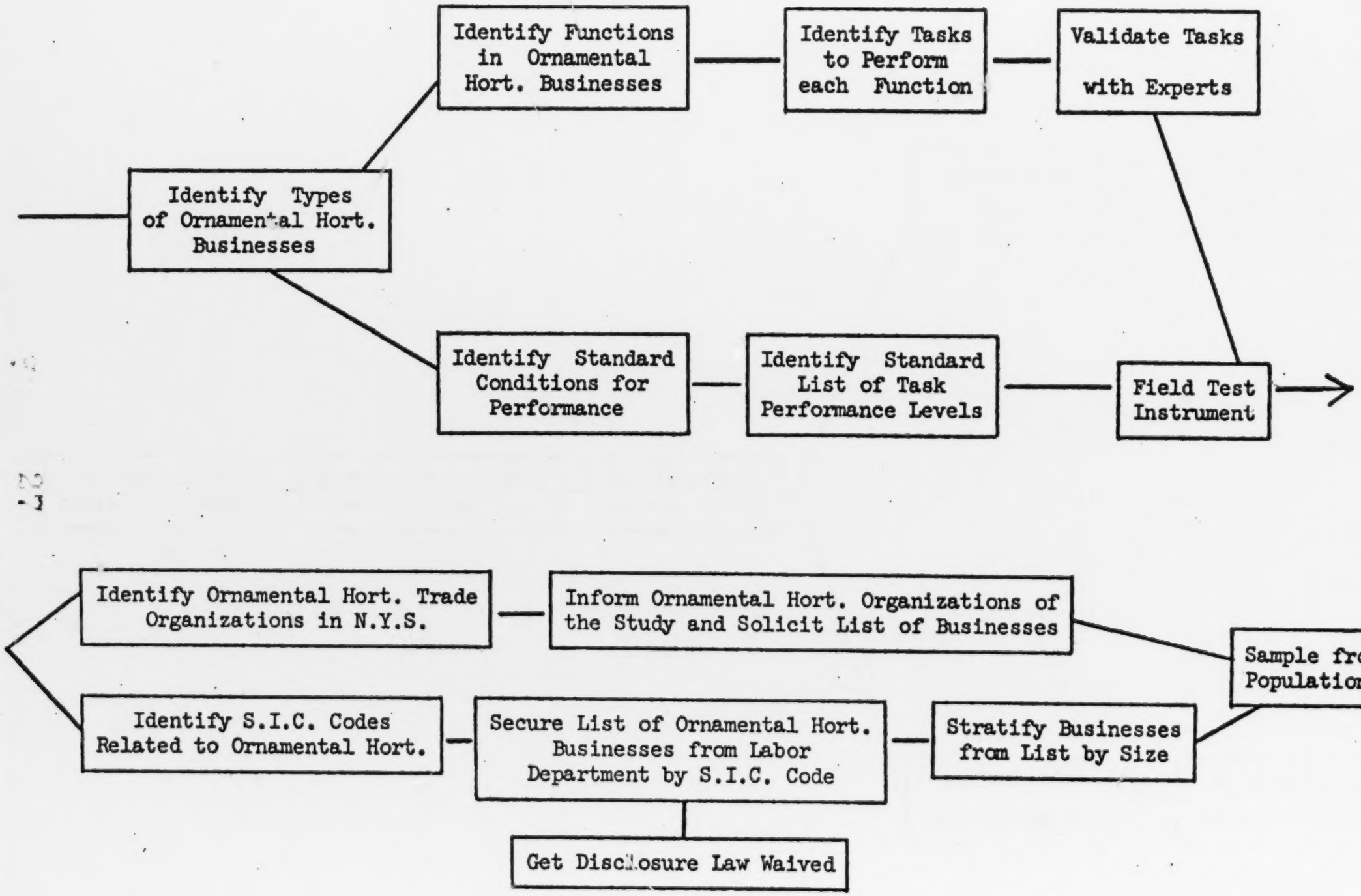

Identify Functions in Ornamental Hort. Businesses
Identify Tasks to Perform each Function
Validate Tasks with Experts
Identify Types of Ornamental Hort. Businesses
Identify Standard Conditions for Performance
Identify Standard List of Task Performance Levels
Field Test Instrument
Identify Ornamental Hort. Trade Organizations in N.Y.S.
Inform Ornamental Hort. Organizations of the Study and Solicit List of Businesses
Sample from Population
Identify S.I.C. Codes Related to Ornamental Hort.
Secure List of Ornamental Hort. Businesses from Labor Department by S.I.C. Code
Stratify Businesses from List by Size
Get Disclosure Law Waived

FIGURE I

FIGURE I

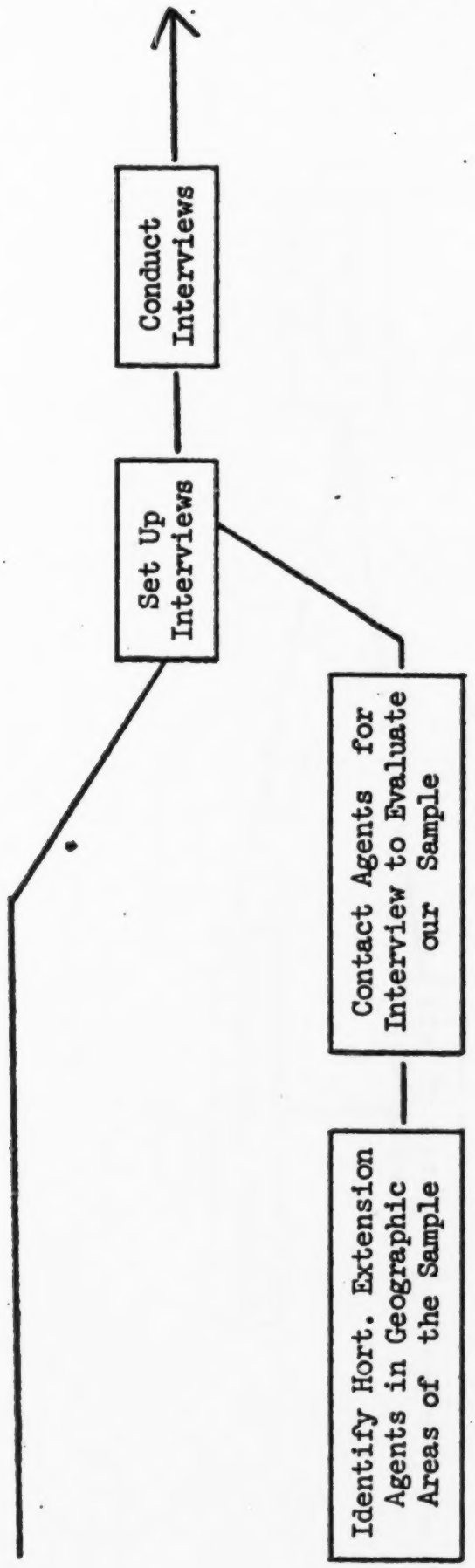
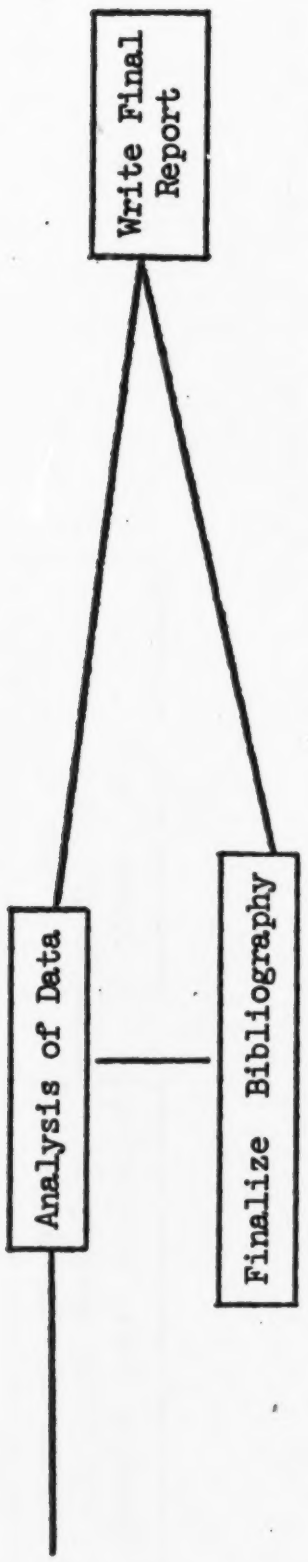

Conduct Interviews
Set Up Interviews
Identify Hort. Extension Agents in Geographic Areas of the Sample
Contact Agents for Interview to Evaluate our Sample

FIGURE I


Write Final Report
Analysis of Data
Finalize Bibliography

Identifying the Business Areas of the Industry

The ornamental horticulture industry, on occasion, may be considered an entity but it is more common to refer to business areas within the total industry. The primary criteria used to determine business areas were similar products and/or services, the existence of trade organizations, standard industrial classification codes, and/or actual existence of specialized economic units.

It should be noted that in some cases, a strong trade organization may obscure the existence of separate types of businesses. An example of this was found in the ornamental horticulture study. Many Landscape Services, Greenhouse Producers, and Nursery Producers belong to the New York State Nurserymans Association. When such situations arose, it was found helpful to look closely at the physical makeup of each business and categorize according to different services performed or different types of production.

Based on the above criteria, the study identified nine business areas in ornamental horticulture as follows:

1. Retail Florists
2. Farm and Garden Stores
3. Landscape Services
4. Greenhouse Production
5. Nursery Production
6. Arborists Services
7. Turf Production (sod farms)
8. Wholesale Florists
9. Golf Courses (public and private)

Identifying the Population of Firms in Each Business Area

Once the different business areas were determined, the next step was to identify the total population of firms in each area.

To adequately reflect the characteristics of each of the defined business areas, the population of any area was limited to those firms receiving at least 50 percent of their gross income from the sale of services or products related to that area. For example, to be classified as a retail florist, a firm in question had to employ one or more workers and receive more than 50 percent of its income from the sale of services or products commonly identified with a retail florist shop. In cases where a firm was engaged in more than one business area, the firm was classified under its major area of income. In summary, the population is made up of specialized, commercial businesses that employ workers.

Identifying the businesses in each area was accomplished by three methods:

1. New York State Division of Employment SIC code lists
2. Membership lists of ornamental horticulture trade organizations
3. Registry lists from New York State Division of Agriculture and Markets.

If the firms in the business area in question employ workers whose wages are subject to unemployment insurance tax, the Division of Employment of the New York State Labor Department has a record of these firms, classified by Standard Industrial Classification (SIC) codes. The four business areas for which data was available from the Division

of Employment were Retail Florists, Farm and Garden Stores, Landscape Services, and Golf Courses. After waiver of disclosure laws was obtained, (See Appendix A) The New York State Labor Department supplied information adequate to locate businesses and relate their size in terms of recent employment figures.

A second means of identifying businesses was through membership lists of horticulture trade organizations. A letter (Appendix B) outlining the purpose of the study was used to establish a working relationship with the different trade organizations. The trade organizations that supplied lists of their membership firms were, The New York State Nurserymans Association, Long Island Nurserymans Association, New York State Arborists Association, United Florists of Western New York, New York State Flower Industries, The New York State Turf Grass Association, and The Wholesale Florists and Florists Suppliers of America. These membership lists were used to identify firms in three areas, Wholesale Florists, Turf Producers, and Arborists.

The Greenhouse and Nursery firms were identified by a combination of the Division of Employment information and the Trade Organization membership lists. The problem was, that in both cases, no information was available to separate firms into the two business areas. Therefore, the third method of locating Greenhouse and Nursery firms used was a list of certified Nurseries[1] provided by the New York State Department of Agriculture and Markets. Even on this list,

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1. Department of Agriculture and Markets, New York State, List of Certified Nurseries and Dealers registered as of January 10, 1969 for year ending September 30, 1969. Albany, New York, 77 pages.

one-third of the businesses were listed as both Greenhouse and Nursery, necessitating cross-checking from the three sources of information.

Sampling from the Population

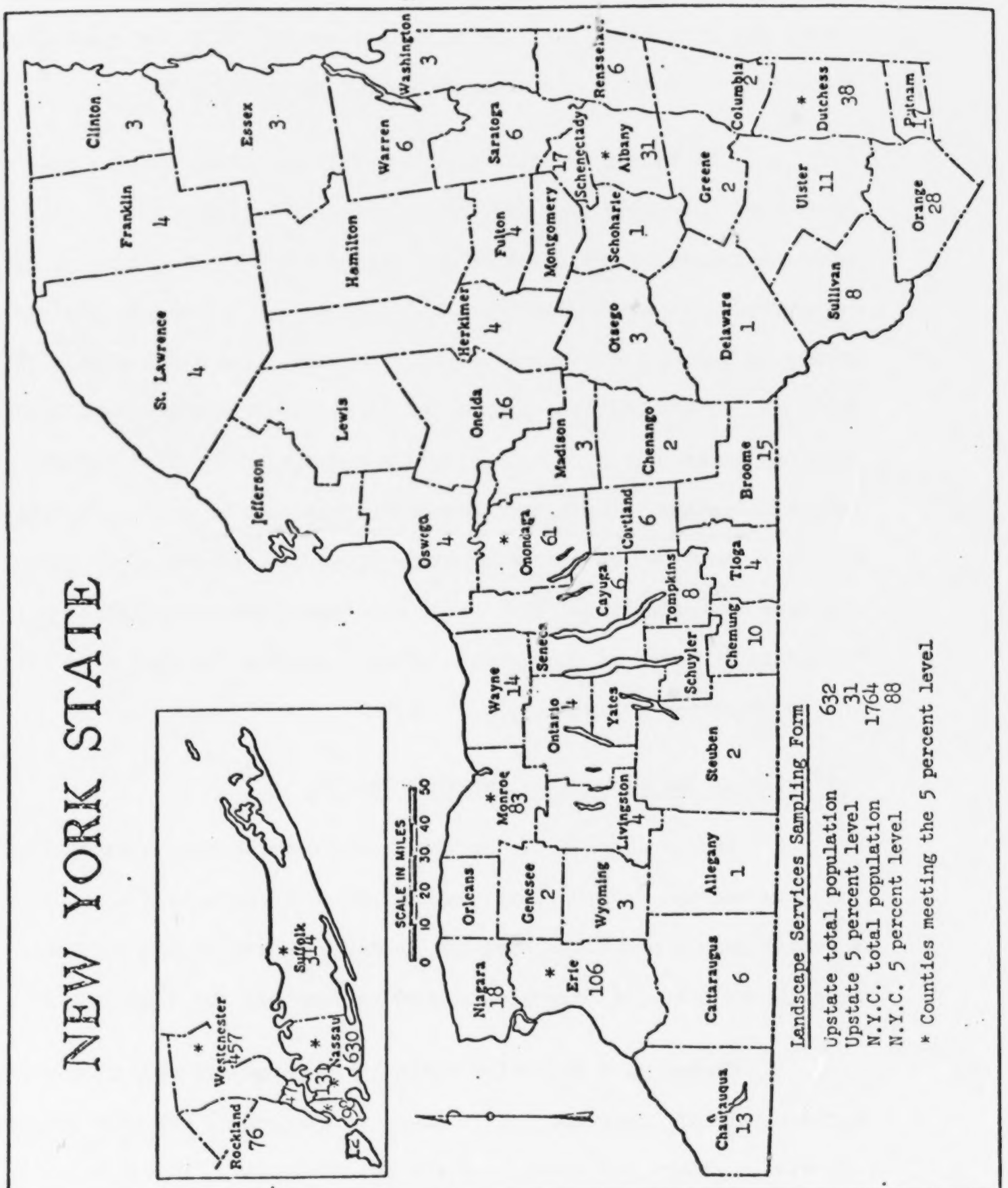
The number of firms for each type of business area was plotted by county and borough in New York State. All counties or boroughs which contained 5 percent or more of the total number of firms for a given business area in New York City or Up-State New York were considered as areas of concentration for that business area. A sample of firms was interviewed in each area of concentration for each business area. Figure II, as an example, is the sampling map used for Landscape Services.

This procedure assured sampling in all geographical locations where firms in each business area were concentrated. Choosing a percentage smaller than 5 for selection of concentration would have provided greater geographic distribution but at the same time would further dilute the contribution of firms from a county having a large population. For the type of distribution the ornamental horticulture industry of New York State represents, the 5 percent level was judged adequate in adjusting for sampling based on concentration and geographical distribution.

It is appropriate to include some discussion of data collection within the explanation of the sampling procedure, since for given resources the size of the sample is somewhat dependent upon the type of data collection method used.

A task analysis study necessitates the preparation of a detailed questionnaire and uniform data collection. For these reasons, the personal interview technique was selected as the method of data

FIGURE II


NEW YORK STATE
Clinton 3
Essex 3
Franklin 4
St. Lawrence 4
Hamilton
Warren 6
Washington 3
Saratoga 6
Rensselaer 6
Schenectady 17
* Albany 31
Columbia 2
* Dutchess 38
Putnam 12
Montgomery
Fulton 4
Schoharie 1
Greene 2
Ulster 11
Orange 28
Herkimer 4
Otsego 3
Delaware 1
Sullivan 8
Lewis
Onelda 16
Madison 3
Chenango 2
Broome 15
Jefferson
Oswego 4
* Onondaga 61
Cortland 6
Cayuga 6
Tompkins 8
Tioga 4
Schuyler
Chemung 10
Wayne 14
Seneca
Ontario 4
Yates
Livingston 4
* Monroe 83
Orleans
Genesee 2
Wyoming 3
Allegany 1
Steuben 2
Niagara 18
* Erie 106
Cattaraugus 6
Chautauqua 13
Rockland 76
Westchester 457
* Suffolk 314
* Nassau 630
SCALE IN MILES
0 10 20 30 40 50
Landscape Services Sampling Form
Upstate total population 632
Upstate 5 percent level 31
N.Y.C. total population 1764
N.Y.C. 5 percent level 88
* Counties meeting the 5 percent level

collection. A second advantage of this method is the first hand knowledge the researchers derive from the field work. By going into the field, the researcher can come in direct contact with the questions that arise concerning the articulation of the instrument.

The number of interviews feasible for each business area was determined and based on: (1) the resources available; and (2) the relative number of employers in the business area in New York State. A summary of the sampling indicating the number of interviews for each county or borough of concentration by business area is presented in Table I. In general, the ornamental horticulture study interviewed one business in each area of concentration identified by the 5 percent selection method. Deviations from this rule were made in cases where a county contained an unusually large proportion of the total number of one type of business in which case, two interviews were conducted. This deviation occurred in Orange and Suffolk counties for turf producers, and in Manhattan for wholesale florists.

Selection of the Specific Firms to Interview

Application of the personal interview technique results in a small percentage of the total population of firms acting as respondents. For this reason and because of the in-depth nature of task analysis, it is critical that the selection procedure identify the right business.

Cooperative Extension Field staff personnel responsible for horticulture in their respective areas were asked to act as a jury of experts to select the specific firms for interview. In establishing a list of selection criteria for use by the extension agent, the objectives of task analysis were considered. Since the primary purpose of

COUNTIES IN NEW YORK STATE CONTAINING 5 PERCENT OR MORE
OF ORNAMENTAL HORTICULTURE FIRMS BY BUSINESS
AREA AND NUMBER OF FIRMS (1)

TABLE I

County	Nursery Production	Greenhouse Production	Total Greenhouse & Nursery Firms*	Arborists	Sod Farms	Landscape Services	Farm And Garden Stores	Retail Florists	Wholesale Florists	Golf Course
UP-STATE NEW YORK										
Erie	102	138	225	5	-	104	18	61	3	22
Monroe	87	93	168	7	2	84	15	43	2	24
Wayne	-	-	-	-	-	-	10	-	-	-
Onondaga	57	63	117	6	-	61	8	32	-	26
Oneida	-	-	-	-	-	-	-	-	-	17
Albany	40	48	84	-	-	31	9	23	2	-
Dutchess	-	-	-	9	-	38	8	-	-	-
Orange	-	-	-	-	4+	-	7	-	-	-
Ulster	-	-	-	3	-	-	-	-	-	-
Total Up-State	-	-	1668	61	9	632	142	403	14	356
5 Percent Level	-	-	83	3	2(1)	31	7	20	2(1)	17
NEW YORK CITY AREA										
Westchester	198	108	249	27	-	453	19	75	-	57
Rockland	-	-	-	-	-	-	-	-	-	11
Bronx	-	-	-	-	-	-	-	59	-	-
Manhattan	-	-	-	-	-	-	12	256	15+	-
Kings	39	21	45	-	-	98	-	114	-	-
Queens	-	-	-	-	-	131	7	122	-	12
Richmond	-	-	-	-	-	-	6	-	-	-
Nassau	132	90	156	17	-	639	42	98	-	52
Suffolk	276	213	369	15	6+	322	47	56	-	47
Total for City	-	-	864	61	6	1764	138	791	18(1)	194
5 Percent Level	-	-	43	3	2(1)	88	6	39	2(1)	9
Total Firms N.Y.S.	-	-	2532	122	15	2396	280	1194	32	550
No. of Interviews	8	8	-	8	5	10	13	11	5	9=

Total Firms - 7121

(1) Sod farms and wholesale florists sampling done on the basis of concentration since the total population is very small
\+ Denotes that there will be two (2) done in this country
* Total is less than the number of nurseries and greenhouses, as some production firms have both business areas

the analysis was to develop a worker recruitment instrument, it was decided to interview the firms with large numbers of employees. The firms with large numbers of employees were assumed to be most likely to be interested in developing and using a formal recruiting procedure. The advantages and disadvantages considered in selecting the larger firms were:

Advantages of Sampling from Larger Firms

1. Specialist in each business area more likely to know more about that area.
2. More up to date especially in merchandising and management functions.
3. Interviews more feasible, more time and concentration of the manager.
4. Tasks are essentially the same.
5. More likely to be known by Cooperative Extension agents.
6. More likely to need and use the recruitment instrument.
7. More likely to have an organized recruitment program.
8. More specialized and more likely to identify proficiency levels.
9. Larger number of workers more likely to have labor specialized.

Disadvantages of Sampling from Larger Firms

1. May be highly specialized in terms of products.
2. Smaller population to sample from.

The Cooperative Extension Agents responsible for the respective business areas of ornamental horticulture in the boroughs and counties included in the sample were contacted by a letter (Appendix C) and asked to select 3 firms from the list of establishments for each business area using the following selection criteria:

1. Engaged primarily in ornamental horticulture -- receiving 50 percent or more of gross income or financial support from the sale of ornamental products or services, or the use of ornamental products and/or services for decorative or recreational purposes (not for food or fiber).
2. The type of ornamental horticulture business is primarily in the business area listed.
3. Uses up-to-date and representative business practices and equipment.
4. Participates actively in the horticultural trade organization in their business area.
5. Has a high potential for recruiting ornamental horticulture workers as evidenced by:
   a. Employment of the largest number of full-time and/or seasonal workers as compared with similar firms.
   b. Experiences a high degree of business growth as compared to similar firms.
   c. Recruitment of the largest number of workers during the past year as compared to similar firms.

6. Cooperative and receptive to interview.

The contribution of the Cooperative Extension Agent as knowledgeable experts in each area is a critical step in selecting respondents. This is particularly evident in situations like Nassau County where in one instance, the agent was asked to choose the landscape firms that best met the selection criteria from a population of 630 businesses.

Summary of Sampling Procedure

1. Identify counties and boroughs with a 5 percent or more concentration of firms by business area from:
   a. Division of Employment (SIC lists)
   b. Trade Organization membership lists
   c. Registry or licensing lists from Division of Agriculture and Markets
2. Determine the sample size
   a. Dependent on resources for data collection
   b. Dependent on method of data collection
3. Selection of specific firms to interview based on the needs of the study.

Construction of the Questionnaire

Identifying Functions in the Ornamental Horticulture Industry

In this study, a function is defined as a process involving closely related tasks within a single business area of the industry which is essential for the success of that business area. The functions were identified through a review of the literature on related studies,

the business operation and counsel with experts at Cornell University in the respective business areas. The functions were further validated when it was found that tasks could be logically clustered under the functions identified.

As expected, there are functions common to all nine business areas of ornamental horticulture, as well as functions that are particular to only one or two business areas. For example, the management and record functions are common to all nine areas while functions such as harvesting and propagation are common only to businesses involved in production.

Developing a List of Tasks for Each Business Area

The development of occupational profiles for use as both a recruitment and curriculum development guide requires an in depth analysis of worker activities. Past studies as reported in Workers in Agribusiness [1] publication have experienced problems in articulation when using job titles. It appears reasonable to expect in a rapidly expanding and changing area such as agribusiness, that in some businesses old job titles are transferred to name new duties while in other businesses the same new duties may develop new job titles. To avoid this dilemma, the Functional-Activities Theory[2] or task analysis approach was used. This means a list of tasks must be compiled for each identified function in each business area.

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1. Taylor, Lee and J. Paul Leagans. Workers in Agribusiness, page 123. Cornell University Agricultural Experiment Station, New York State College of Agriculture, Ithaca, New York. March 1970. 238 pages.

2. Berkey, Arthur L. The Importance of Activities Performed in Functions of the Farm Machinery Industry as a Basis for Training Programs, Thesis, Doctor of Philosophy, Michigan State University, East Lansing, Michigan, 1967. p. 62.

The search for tasks began with job description texts such as the "Dictionary of Occupational Titles" and the "Standard Industrial Classification Manual." Tasks were sorted from job descriptions of areas related to each of the businesses. Previous studies and curriculum guides were consulted and provided additional clues in identifying tasks. As the preliminary lists grew, the tasks were classified under functions in each business area.

The preliminary task lists were presented to experts in each business area for additions and corrections. Persons in two areas of expertise were sought; first, the Cornell University staff teaching in each of the areas, and second, Cooperative Extension Field staff serving the ornamental horticulture industry. An important contribution of the experts, in addition to making the list complete, was to state the tasks in the language of the industry.

The compiling of tasks for the nine areas of business in ornamental horticulture proved to be a time consuming and demanding process. The task search began on July 15, 1970 and concluded with final verification on December 15, 1970. Complete task lists for each of the 9 business areas are presented in Appendix D.

The operational model in Table II was used as a guide in writing task statements. The construction of this simple model was very effective in resolving to what extent the task statement describes work performance.

TABLE II

Elements of Work Performance

TASK STATEMENT: Take Customer Orders

1.

A Sales	Person	Takes Customer Orders	by Phone	in a Florist Shop
Why	Who	What	How	Why and Where
Function	X	Task	Tools	Business Area

TASK STATEMENT: Sow Seed

2.

On a Sod Farm	A Laborer	Operates Farm Machinery	To Sow Seed
Why and Where	Who	How	What
Business Area	X	Tools	Task

Task Information to be Collected by the Instrument

The verification of the task statement related only what is done, while the task analysis procedure includes collection of additional data concerning the conditions under which the task is performed and the performance level. Reference to The Dictionary of Occupational Titles materials[1] that articulate the background of employer job description forms were helpful in establishing a classification for physical requirements and working conditions of tasks. (Tables III, IV, and V)

One of the objectives of task analysis is to organize the data in such a fashion as to identify tasks which the handicapped may perform. To facilitate this objective, the instrument must be designed in a manner which will allow counselors to identify such tasks.

1. United States Department of Labor, Dictionary of Occupational Titles, Volume II, 1965. pp. 651-656.

TABLE III

Division and Explanation of Strength Requirements[1]

1.	Sedentary	Maximum life 10 pounds
2.	Light	Maximum life 20 pounds
3.	Medium	Maximum life 50 pounds
4.	Heavy	Maximum life 100 pounds
5.	Very Heavy	Maximum life over 100 pounds

TABLE IV

List of Discernable Physical Activities[2]

1. Climbing, balancing
2. Kneeling, stooping, crawling, crouching
3. Handling, reaching, fingering, feeling
4. Talking, hearing
5. Seeing, depth perception, color vision, acuity - far or near

A recent book, by Angel,[3] deals with job analysis for handicaps and advises researchers to use a suggested set of physical requirements and working conditions[4] very similar to Labor Department Standards. (Tables VI and VII)

1. IBID.

2. IBID.

3. Angel, Juvenal L. Employment Opportunities for the Handicapped, World Trade Academy Press, Inc., 50 East 42nd Street, New York, New York, 1969. 411 pp.

4. IBID. p. 143.

TABLE V

Working Conditions for Task Performance[1]

1. Description
   a. Inside 75 percent or more
   b. Outside 75 percent or more
   c. Both, inside and outside
2. Cold plus temperature change
3. Hot plus temperature change
4. Wet and humid
5. Noise and vibration
6. Hazards; mechanical, electrical, high places, burns, etc.
7. Fumes, odors, dust, poor ventilation, toxic conditions

Personal contacts with members of the New York State College of Industrial and Labor Relations (I.L.R.) specializing in handicapped worker studies led to additions to the questionnaire. The I.L.R. Staff suggested that asking for the amount of supervision task performance received and the extent to which the task demanded worker association would be helpful tools in the hands of handicapped worker counselors. (Table VIII)

An important aspect of task performance which is very helpful in describing work performance is the type of equipment used by the worker. The following example will illustrate this concept. The knowledge whether hand or power equipment is used in milking a dairy cow, adds an important and useful adjective to work performance. (Table IX)

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1. IBID.

TABLE VI

Environmental Conditions Under Which the Worker May Have to Perform[1]
(For Handicaps)

1. Inside (or can move inside in inclement conditions 75 percent or more of the time)
2. Outside (or no protection from bad weather conditions 75 percent or more of the time)
3. Sudden temperature changes
4. Wet or humid conditions
5. Noisy
6. Heights
7. Mechanical or electrical hazards
8. Toxic conditions
9. Working speed (expected to perform rapid operations)
10. Repetitive operations
11. Public contacts

TABLE VII

Physical Conditions Under Which the Worker May Have to Perform[2]
(For Handicaps)

Standing	Crouching	Carrying ____ lbs.		
Walking	Crawling	Pushing ____ lbs.		
Sitting	Reaching	Hearing ____	1.	Ordinary sounds
Jumping	Handling		2.	Other sounds
Running	Fingering		3.	Lip read
Climbing	Feeling	Seeing ____	1.	Depth perception
Balancing	Talking		2.	Field of vision
Kneeling	Lifting ____ lbs.		3.	Color vision

1. IBID.
2. IBID.

TABLE VIII

Instrument Additions to Meet Handicapped Requirement

Supervision	Association (with other workers)
1. None	1. Work alone
2. Some	2. Proximity to others
3. Constant	3. Cooperation with others
4. Varies by individual	

TABLE IX

Equipment Used in Task Performance

1. Hand tools
2. Power equipment
3. Both hand and power equipment
4. No equipment used

Designing the Questionnaire Form

After all the task information data to be collected was determined, the job of designing the form of the questionnaire followed. The task lists average 105 items for each business area and the data for each task totals 20. Thus the gross number of data 70 to 80 respondents will produce is very large. This meant that careful attention must be directed to design to assure the instrument will be easy to administer during the interview. A second concern was to precode the instrument such that raw data could be easily punched on computer cards directly from the instrument. The form drafted for use in the study provided for computer coding on the line below the respondents' answers and allowed

for 20 responses to each task on the same line. Appendix E contains copies of both the basic questionnaire form, an explanation key and coding instructions.

The requirements for a preliminary information sheet were concerned with obtaining a description of the business interviewed. Since the sample was limited in terms of the total population of firms in any one area, the preliminary information cannot be used to project totals for the industry as a whole. The information does, however, provide a picture of the firms in the sample. A copy of the preliminary information sheet is contained in Appendix F.

Pretesting the Instrument

The respondent questionnaire was pretested with four personal interviews conducted by four of the project's interviewers. The pretest was made to determine the length of time to complete interviews, to uncover any problems in using the instrument in its present form, and to test the clarity and completeness of the task lists.

The pretest determined that the task lists were essentially complete and that the time required for the interview was dependent on the length of the task list. As a planning guide in determining resource requirements for data collection, a maximum time of 2 hours was allotted per interview. Task statements were modified as indicated in the pretests.

The pretest also confirmed a tentative conclusion already reached by the researchers that identification of entry level tasks was not feasible. Employers in horticulture recruit workers at all employment levels and entry level varies between the nine horticultural business areas. It was, therefore, decided not to include the entry level aspect in the task analysis model.

Data Collection Procedures

Planning for Using the Interview Method

The personal interview method is a commonly used research procedure which provides a valid means of data collection. In planning a study to utilize this method, it is necessary to realize that the interviews will require a considerable amount of the project's resources in terms of both money and time.

When interviewers were hired, well planned training sessions were conducted to thoroughly acquaint the new researchers with the study's objectives and the interview techniques. The training session also included an explanation of operational procedures such as types of transportation, credit card use, travel expense payment and field coordination required to support interviews.

In conducting the interviews for the study, each interviewer was provided an interviewer's brief. The brief contained: the interviewer's letter of introduction; directions to coordination sites; a general background of the ornamental horticulture task analysis study; a coding key for the task analysis questionnaire; a copy of the procedure used in selecting a business to interview; and an interviewer's guide. (Appendix G) Other materials required by the interview teams were: extra copies of questionnaires; a list of alternate interviews; road maps of the areas; and stamped, addressed envelopes for returning questionnaires by mail where respondents finished completing the questionnaire on their own. Appendix H lists the items taken on the ornamental horticulture task analysis project interviews.

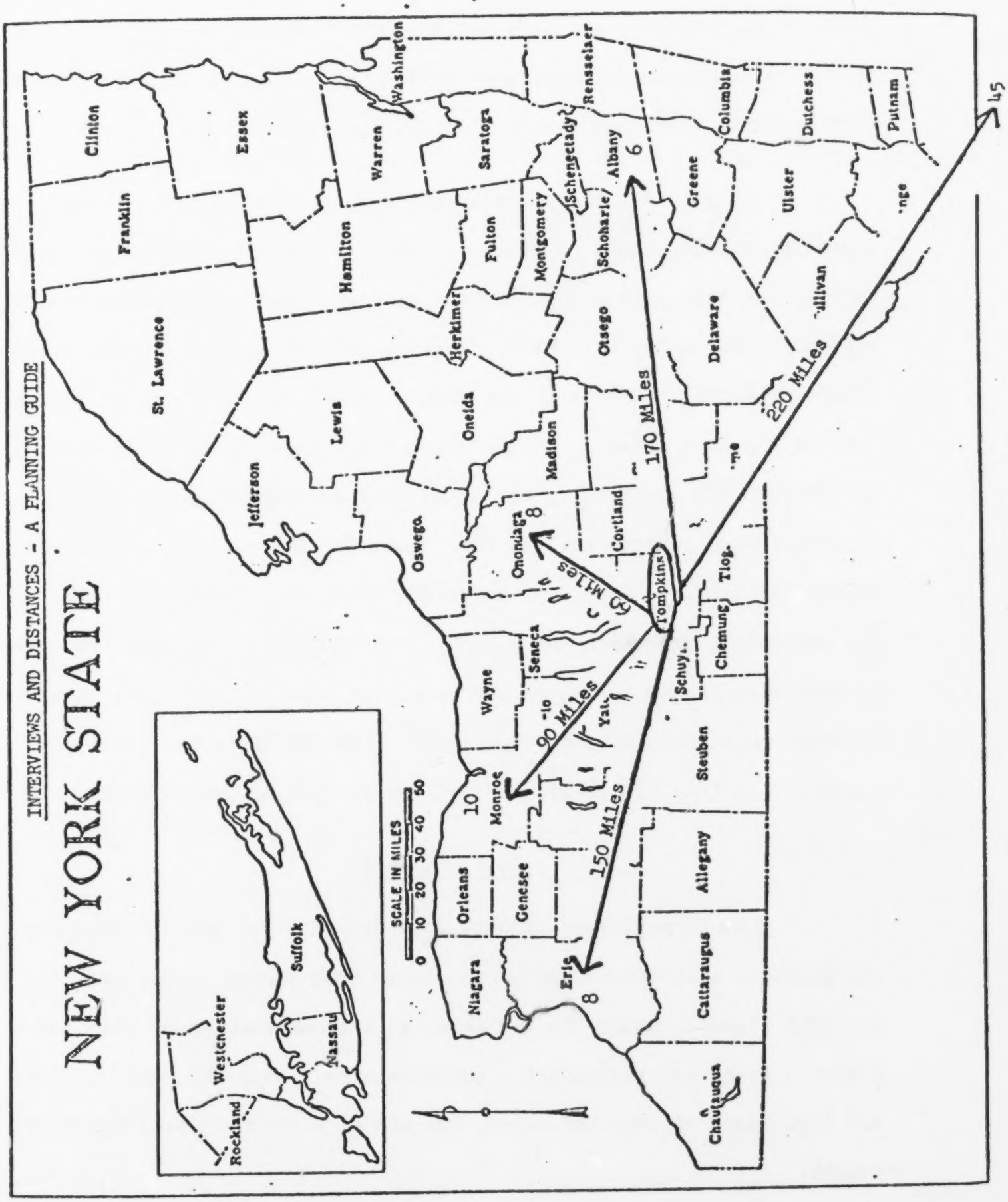
The interviewing period was set to coincide with the businesses' slack period and a time when the interviewers were available. The two week period of the January semester break met both these requirements. The field plan of the ornamental horticulture interviews was to divide the State into areas that could be interviewed by a team of two researchers within a week's time.

The map, Figure III, displays the general dispersion and distances to the interview areas. The pretest indicated that a team of two would do well to complete 4 interviews per day. On this basis, plans were made to complete most of the interviewing in the last two weeks of January. Two teams were dispatched to New York City the first week. During the second week, one team returned to New York City and then on to interview in the Albany area; while the second team interviewed the Buffalo and Rochester area businesses. It was felt that the Syracuse interviews could be handled on a daily commuting basis from the Cornell Campus at Ithaca. As it turned out, the only deviation from the plan was caused by a severe snow storm in Western New York during the second week of operations. This left 3 interviews in Buffalo and 8 in Syracuse outstanding. These were easily finished with one day trips over the next 4 weeks.

Conducting the Interviews

Much of the success of the field operations can be attributed to the help provided by the Cooperative Extension Agents. On the interviewing trips, the first stop in a metropolitan area was to contact the respective Cooperative Extension Agents. The Agents provided maps and directions to interview sites which saved much time for the interviewing teams. After obtaining the list of businesses from Extension Agents,

FIGURE III


INTERVIEWS AND DISTANCES - A PLANNING GUIDE
NEW YORK STATE
Clinton
Essex
Franklin
St. Lawrence
Hamilton
Warren
Washington
Saratoga
Schenectady
Rensselaer
Albany
Montgomery
Fulton
Herkimer
Schoharie
Otsego
Greene
Columbia
Dutchess
Putnam
Ulster
Delaware
Sullivan
Lewis
Oneida
Madison
Oswego
Jefferson
Onondaga
Cortland
Tompkins
Wayne
Seneca
Yates
Schuyler
Chemung
Tioga
Steuben
Allegany
Cattaraugus
Chautauqua
Erie
Niagara
Orleans
Genesee
Monroe
Westchester
Rockland
Suffolk
Nassau
170 Miles
220 Miles
90 Miles
150 Miles
SCALE IN MILES
0 10 20 30 40 50

the interviewers called the firms to arrange a meeting time. Except for a few instances where businessmen were on vacation, the study found businessmen cooperative. This success can be attributed to the use of Extension Agents as references as well as interviewing during the ornamental horticulture industries slack business period.

As planned, the procedures for interviews varied somewhat depending on the wishes of the respondent. Some respondents preferred to have the task read aloud by the interviewer and he then made verbal responses from a key which the interviewer recorded on the questionnaire. Others preferred to complete the form on their own following an explanation by the interviewer. In the case of the latter, the interviewer was free to code previously collected data or make telephone calls confirming future interviews. In four cases the interviewer found the respondent willing, but too busy to complete the data sheet. In these cases, the respondent was given the directions necessary to fill out the questionnaire and asked to return the completed form by mail. The interviewer provided an addressed, stamped mailer. Three of the four "interviews" conducted in this manner resulted in the receipt of useful data.

Data Analysis

The large amount of task data collected by the 74 interviewers was analyzed with the aid of a computer. Even though coding was done on the line directly under the raw data, it took an average of one hour to properly code each respondent's questionnaire. Once the data was coded and keypunched on computer cards, the aid of a computer programmer was sought.

The most meaningful statistic produced from the analysis of data from a small number of similar businesses is the mode, or most common response. The median or average is not meaningful as shown in the following example: The average response was calculated on weight requirements of 10 businesses reporting the task, trimming hedges. Two respondents reported it was a light task and eight responded by circling heavy. It is obvious that the average would be somewhere between light and heavy or medium. The interesting point is that no business said it was a medium task, thus using an average would be misleading.

In the course of analyzing the data for the study, it was necessary to use a competent programmer to write a program as no canned program was available to present the data in an easily utilized form. The computer printout was then transferred to basic data reporting sheets. A copy of the computer program used to calculate the modal response in analyzing the data is detailed in Appendix I.

In examining the data to prepare a recruitment instrument, tasks that are common to all or most of the business areas were identified. The task numbering system is such that it facilitates identification of common tasks. However, computer analysis showed the conditions and performance levels typically different for similarly stated tasks in different business areas. These varied conditions under which the common tasks are performed may well limit the value of clustering of these as a basis for core training programs and/or recruitment. It may be found, however, that there are basic underlying knowledges, skills, and abilities necessary to performance of common tasks which are important for development of training curricula and recruitment. Thus it was concluded that

similarly stated tasks were not common where variations in task conditions and performance levels existed. Most tasks in the records and management functions were found to be common in all 9 business areas.

Assembling the Findings into Useful Format

The objectives of the model require the final output to provide both employment agencies and employers with a tool for locating and describing the kind of worker needed. The form extended to worker recruiters, as they determine the competence of job applicants, could consist of a list of all the tasks, by area, that were checked as performed in the business and the mode or most common response for each task condition and performance level.

Treatment of the Handicapped Aspect

One of the objectives of the study was identification of tasks that could possibly be performed by handicapped persons. The researchers had originally hypothesized that tasks could be in some way identified as being able to be performed by specific types of handicapped persons. The search for experts to qualify such a relationship led to the Division of Vocational Rehabilitation Center in Albany, New York.[1] Vocational Rehabilitation personnel expressed the opinion that tasks and types of handicaps could not be meaningfully associated. The rationale given was that handicaps are diverse and vary considerably between and within different kinds of handicaps, e.g. a partially sighted person with retina damage could not do any lifting while another partially sighted person without retina damage might be able to lift at normal

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1. Miss Marion Martin, Director of Vocational Rehabilitation Operations, Division of Vocational Rehabilitation, 162 Washington Avenue, Albany, New York, 12210.

levels. The Vocational Rehabilitation personnel advised that rather than attempt to identify the tasks that could be performed by handicaps, a useful approach would be to develop detailed task data consisting of the list of tasks with modes of the conditions and performance levels. The companion publication of the study, An Analysis of Tasks Performed in the Ornamental Horticulture Industry, was designed to incorporate this purpose.

CHAPTER IV

FINDINGS OF THE STUDY

The testing of the preliminary model in the ornamental horticulture study resulted in task analysis data indicating that the model is viable. The success experienced while conducting the study led to the conclusion that certain aspects of the model were critical in obtaining optimum results. Although all aspects of the model were necessary, the following list depicts those areas that required the most careful planning and execution.

Critical Aspects of the Model

1. Selection of the firms which best meet the criteria for interviewing (use of Cooperative Extension Agents).
2. Completeness of task statement lists
3. Design of a questionnaire that collects the desired information and is easily coded for keypunching on computer cards.
4. Development of interviewing techniques that most fully utilize both researcher and respondent time.
5. Interviewer training sessions to insure that all researchers are knowledgeable and use consistent procedures.
6. Use of a computer program that prints out the detailed task data in a form readily transferred onto summary pages.

7. Organization of the publication presenting the detailed task data into a form easily read by potential users. It is anticipated that the detailed task data may be used by Employment Service Counselors, Staff in the New York State Vocational Rehabilitation Division and persons developing performance objectives for educational programs preparing workers for the ornamental horticulture industry.

Task Data Developed in the Study

The testing of the task analysis model resulted in development of a validated list of tasks for each of the nine business areas identified in the horticulture industry in New York. These task lists are presented in Appendix D. In the next phase of the overall study, these lists serve as the basis for a trial instrument for recruiting horticultural workers based on tasks to be performed in the job.

The task anslysis model also provided detailed data for each of the individual tasks. Data as to equipment involved, strength required, extent of supervision and association with others, working conditions and performance levels are provided. A description of the detailed task data is presented in the key for ornamental horticulture task analysis in Appendix E (Part II).

The second publication of this study, An Analysis of Tasks Performed in the Ornamental Horticulture Industry reports the detailed task data and gives suggestions for use of this information. This publication is also used in the recruitment phase of the project that follows the task analysis model development. Employment Service Staff use the data in counseling prospective workers interested in working in horticulture.

CHAPTER V

CONCLUSIONS

Proposed Changes in the Model

Based on the findings of the study in terms of the stated objectives, the conclusions drawn regarding the preliminary task analysis model tested are:

1. In its original state, the interview questionnaire takes nearly two hours to complete. Further development of the questionnaire format may reduce this time requirement to 30 minutes. During the interview it was found that as the tasks were organized into functional areas, many of the tasks in one functional area were performed under similar conditions. It may possibly be expedient and just as meaningful to have the respondent indicate the general conditions and requirements for each function and indicate how specific tasks may deviate from the standard conditions of the function. Also, the conditions and requirements of tasks in the functions of Management and Records are almost identical throughout the task lists and are nearly the same for all business areas. Perhaps for these two functions, the most meaningful data is if these tasks are performed or not.

2. The task information collected is useful only if it gives a complete picture of work performance. The amount of supervision received is an important question when placing a specific worker for a particular job. The data obtained from the ornamental horticulture study indicates that the response to this question is more variable between employers than between tasks. Therefore, it is suggested that future research of this kind not include responses as to the type of supervision a new employee will receive.
3. The response to the question of quantitative performance in terms of units per hour was negligible. It is therefore recommended that either more emphasis be put on measuring performance by production or that this part of the quantitative performance question be dropped completely.

In summary, recommendations for model changes are (1) that task information be collected for each function and task deviation from the standard be noted, (2) that the only data collected for Records and Management Function tasks is whether that task is performed, (3) that the question of supervision not be asked during the interview, and (4) that the area of quantitative performance calling for a unit per hour response not be asked during the interview.

Summary of the Final Model Proposed for Task Analysis in Agribusiness

The major steps of the final procedural model for task analysis in ornamental horticulture is presented in outline form below. For detailed explanation of the major steps, the reader is referred to the appropriate preceding section of this report.

I. Steps in identifying the businesses to interview
   - A. Select the geographic area to study
   - B. Identify the business areas of the study's industry
   - C. Identify the population of each business area
   - D. Identify the counties of concentration
   - E. Determine the number of interviews to conduct
   - F. Select the businesses to interview

II. Preparation of the questionnaire
   - A. Identify functions performed in the business area
   - B. Develop a list of tasks for each function in each business area
   - C. Identify the task information to be collected by the questionnaire
   - D. Design the questionnaire's format

III. Data Collection
   - A. Pretest the questionnaire for clarity, completeness, and as a guide to allocating resources
   - B. Budget time and materials needed to conduct the interviews
   - C. Conduct training sessions for interviewers
   - D. Conduct the interviews

IV. Data Analysis

A. Code instruments

B. Keypunch data on computer cards

C. Analyze data by computer to compute modal response

D. Organize findings in a form consistent to meet objectives of the task analysis

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APPENDIX A

LETTER TO OBTAIN AUTHORIZATION TO GAIN ACCESS TO S.I.C. MATERIALS

NEW YORK STATE COLLEGE OF AGRICULTURE
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
CORNELL UNIVERSITY
ITHACA, N. Y. 14850

DEPARTMENT OF EDUCATION
STONE HALL

Dr. Alfred L. Green
Executive Director
Division of Employment
NYS Department of Labor
State Campus
Albany, New York 12201

Dear Dr. Green:

This letter is to request authorization to obtain data subject to disclosure restrictions from Department of Labor unemployment insurance records. The information will be used in the agribusiness occupational project which is funded by the New York State Department of Labor.

Project Description

The agribusiness occupations project was originally jointly funded in 1968 by the Division of Employment of the New York State Department of Labor and the College of Agriculture at Cornell University. Workers in Agribusiness, Cornell University Agricultural Experiment Station Bulletin No. 1029, was the report of the initial research.

In June 1970 an amendment to extend the contract through June 30, 1970 for a supplemental research project was executed. This current research is being conducted by two Departments of the College of Agriculture at Cornell. The Department of Education Faculty are conducting research on task analysis in ornamental horticulture. Faculty in the Department of Rural Sociology are working in the area of recruitment and organizational models. The information requested will be used primarily in the Department of Education phase of the research. A copy of the supplemental proposal is attached for your information.

Information Needed

First and third quarter employment insurance data for the SIC Codes indicated:

A. Individual establishment, names, addresses, numbers of employees by type (seasonal and annual) and descriptions of products and/or services.

B. Summary data of "A" above by county

C. Stratification of the data in "A" above by number of workers and/or zip codes

Standard Industrial Classification (SIC) Codes -- Related to Ornamental Horticulture:

0192 -- Horticultural Specialties

Establishments primarily engaged in the production of greenhouse, frame, cloth house, lath house, or outdoor grown horticultural specialty crops, such as bulbs, florists' greens, herbs, mushrooms, vegetables, flower seeds, and sod crops.

0731 -- Horticultural Services

Establishments primarily engaged in performing horticultural services, such as cemetery upkeep, landscape gardening, and tree planting.

5969 -- Farm and Garden Supply Stores - not elsewhere classified

Establishments primarily engaged in the retail sale of seeds, bulbs, nursery stock, and other farm, lawn, and garden supplies and tools not elsewhere classified.

5992 -- Florists

Establishments primarily engaged in the retail sale of cut flowers and growing plants.

7942 -- Public Golf Course

Establishments engaged in operating golf courses open to the general public.

7947 -- Golf Clubs and Country Clubs (private)

5099 -- Wholesalers -- not elsewhere classified

1. Florists - wholesale (without growing)
2. Flower bulbs - wholesale
3. Flowers - wholesale

Form of Information

Listings on heat transfer paper and names and addresses of individual establishments on labels.

Purpose and Use for Information

Lists of individual establishments will be used for identification of a preliminary population of horticulture businesses. Modification of the preliminary population is planned by comparison with membership lists of horticulture organizations in New York, e.g., the New York State Nurseryman's Association.

Summary information would be used to stratify the sample size of business and geographical area. Personal interviews will be used to gather data from establishments in the sample.

Use of the information would be limited to the Cornell research team conducting the agribusiness occupations project. No individual establishments will be identified in project publications.

Information Retrieval Procedures

Members of the Cornell Research team would coordinate with appropriate New York State Department of Labor and/or Department of Commerce personnel. It is requested that the data be available from either the New York State Department of Labor or Department of Commerce, whichever is most expedient for data retrieval. Also it would be appreciated if this sharing of data between the two New York State agencies could be accomplished at minimum cost.

Thank you for your consideration in this matter.

Very truly yours,

(appropriate Cornell representative)

cc: Richard K. Klatt
Superintendent of Farm Employment Service
155 Main Street, W.
Rochester, New York 14614

Arthur L. Berkey

br

APPENDIX B

LETTER TO ORNAMENTAL HORTICULTURE
TRADE ORGANIZATIONS

NEW YORK STATE COLLEGE OF AGRICULTURE
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
CORNELL UNIVERSITY
ITHACA, N. Y. 14850

DEPARTMENT OF EDUCATION
STONE HALL

October 14, 1970

I am writing to request the assistance of your organization in a task analysis study of the horticulture industry in New York State. The purpose of the study is to identify the tasks performed in the industry, to include the conditions under which the tasks are done and the level of satisfactory performance required. This task analysis information will then be used to develop a recruitment instrument whereby employers can check the tasks that the person they wish to employ can perform. The instrument will also be used by the New York State Employment Service to determine the horticultural skills of persons seeking employment.

The study is being conducted by the staff in Agricultural Education of the College of Agriculture at Cornell. Cooperating in the study are the Cooperative Extension specialists in Floriculture and Ornamental Horticulture. The study is being funded by the Division of Employment, New York State Department of Labor.

Your assistance is requested in:

1. Providing a membership list of your organization. This, along with information from the New York State Labor Department and other organizations, will be used to identify the population of Horticultural establishments in New York. All information provided will be kept strictly confidential and no individual establishment data will be identified.

2. Serving as a sponsor of the study. The data for the study will be gathered by personal interview at a sample of establishments. Your role as sponsor would be to publicize the study and encourage members to participate. Also to perform an advisory role as to the most useful form for the recruitment instruments that will result from the study.

We would be pleased to provide any additional information you may desire. You may call collect at our office, area code 607-256-2197.

As the study is presently in progress, a prompt reply including a list of members will be appreciated. A self-addressed, stamped envelope is enclosed for your convenience.

We hope to have you working with us on this important study.

Sincerely,

William E. Drake, Professor
Agricultural Education Division

Arthur Berkey, Assistant Professor
Agricultural Education Division

WED:br

APPENDIX C
(PART I)

LETTER INFORMING COOPERATIVE EXTENSION
PERSONNEL OF THE STUDY

NEW YORK STATE COLLEGE OF AGRICULTURE
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
CORNELL UNIVERSITY
ITHACA, N. Y. 14850

DEPARTMENT OF EDUCATION
STONE HALL

September 2, 1970

Enclosed is a copy of a letter to horticulture industry organizations requesting their participation in a task analysis study. The purpose and general plan of the study are explained in the letter.

We hope that you will also participate in the study by providing advice and contacts with the horticulture industry persons in your area. Any suggestions you may have will be appreciated. Whenever possible, we plan to work through Cooperative Extension Agents in the field in making contacts for the personal data collecting interviews.

If there is any further information you may desire, you may call our office collect at Area Code 607-256-2197.

Sincerely yours,

William E. Drake, Professor
Agricultural Education

Arthur L. Berkey
Assistant Professor
Agricultural Education

br
Enclosure

APPENDIX C
(PART II)

LETTER ASKING FOR ASSISTANCE FROM COOPERATIVE EXTENSION AGENTS AND SELECTION CRITERIA AND RECORDING FORMS FOR USE BY EXTENSION AGENTS IN SELECTING FIRMS RECOMMENDED FOR INTERVIEW

NEW YORK STATE COLLEGE OF AGRICULTURE
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
CORNELL UNIVERSITY
ITHACA, N. Y. 14850

DEPARTMENT OF EDUCATION
STONE HALL

December 23, 1970

Mr. Ralph N. Freeman
246 Griffing Avenue
Riverhead, New York 11901

Dear Mr. Freeman:

Please refer to our letter of September 2, 1970 concerning "Ornamental Horticulture Task Analysis Study."

As stated in the above letter, our plan is to work through Cooperative Extension Agents in making contacts for the data collecting interviews. At the present time we have completed our sampling procedure and discovered that your county has a sufficient concentration of businesses to interview.

Attached is a list of the business areas within which we will interview. To date we have compiled a list of many of the businesses in your county. Together with our information and your mailing list, we hope to have you select 3 businesses in each area which meet the following qualifications.

1. Engaged primarily in Ornamental Horticulture -- receiving 50 percent or more of gross income or financial support from the sale of ornamental products or services, or the use of ornamental products and/or services for decorative or recreational purposes (not for food or fiber).

2. The type of Ornamental Horticulture business is over 50 percent in the business area listed.

3. Use up-to-date and representative business practices and equipment.

4. Participate actively in the horticulture trade organization in their business area.

5. Have a high potential for recruiting Ornamental Horticulture workers as evidenced by:

   a. Employment of the largest number of full-time and/or seasonal workers as compared with similar firms

   b. Experiences a high degree of business growth as compared to similar firms

c. Recruitment of the largest number of workers during the past year as compared to similar firms

6. Cooperative and receptive to interview.

We plan on calling you in the early part of January to set a time for us to meet with you to select businesses for our interviews in your county.

We hope it will be possible for us to meet the agents of Suffolk and Nassau counties as a group. If this works out, it will be helpful to us if you bring a telephone directory of your area to this meeting.

We feel your participation in this study is an important step in successful data collection.

If there is any further information you may desire, please call our office: 607-256-2197.

Sincerely yours,

William E. Drake, Professor
Agricultural Education

Arthur L. Berkey
Assistant Professor
Agricultural Education

br
Enclosures

Business Area	Interviews
Suffolk County:	
Retail Florists	1
Farm and Garden Stores	1
Landscape Services	1
Greenhouse Production	1
Nursery Production	1
Turf Production	2
Arborists Services	1
Golf Courses	1
Bronx:	
Retail Florists	1
Manhattan:	
Retail Florists	1
Farm and Garden Stores	1
Wholesale Florists	2
Kings:	
Retail Florists	1
Landscape Services	1
Greenhouse Production	1
Nursery Production	1
Queens:	
Retail Florists	1
Farm and Garden Stores	1
Landscape Services	1
Golf Courses	1
Richmond:	
Farm and Garden Stores	1

INSTRUCTION SHEET FOR SELECTING ORNAMENTAL HORTICULTURE BUSINESSES TO BE INTERVIEWED

Background

The ornamental horticulture industry was divided into the nine business areas of (1) retail florists, (2) farm and garden supply stores, (3) landscape services, (4) greenhouse production, (5) nursery production, (6) turf production, (7) arborist services, (8) wholesale florists, and (9) golf courses -- public and private.

The geographical distribution of the interviews scheduled is based on the concentration of the nine business areas in the various counties and boroughs.

In _____ County (Borough) the interviews scheduled are:

Business Area	Number of Interviews Scheduled
1. Retail florists	____
2. Farm and garden supply stores	____
3. Landscape services	____
4. Greenhouse production	____
5. Nursery production	____
6. Turf production	____
7. Arborist services	____
8. Wholesale florists	____
9. Golf courses (public and private)	____

For each interview scheduled, please list on the attached form your first, second, and third choice of businesses for interview. Select businesses from the lists provided, and/or your mailing lists, that best meet the following criteria:

1. Engaged primarily in ornamental horticulture -- receiving 50 percent or more of gross income or financial support from the sale of ornamental products or services, or the use of ornamental products and/or services for decorative or recreational purposes (not for food or fiber).

2. The type of ornamental horticulture business is primarily in the business area listed.

3. Use up-to-date and representative business practices and equipment.

4. Participate actively in the horticulture trade organization in their business area.

5. Have a high potential for recruiting ornamental horticulture workers as evidenced by:

   (a) Employment of the largest number of full-time and/or seasonal workers as compared with similar firms.
   (b) Experiences a high degree of business growth as compared to similar firms.
   (c) Recruitment of the largest number of workers during the past year as compared to similar firms.

6. Cooperative and receptive to interview.

Where a business recommended for interview is engaged in more than one horticultural business area, please list on the form in the space provided the other business areas you would recommend for interview in this business. If none, please so indicate.

Thank you for your cooperation.

LIST OF ORNAMENTAL HORTICULTURE BUSINESSES FOR INTERVIEW FORM

County or Borough _____

Name of Cooperative Extension Agent _____

Address _____
(street) (city) (zip)

Telephone _____
(area code) (number)

Business Area _____

Rank 1.

Business Recommended for Interview (PLEASE PRINT)

Name of business _____

Address _____
(street)

_____,NY
(city) (zip)

Telephone: Area Code _____ _____

Name of person to contact _____

Secondary horticulture business areas recommended for interview _____

_____

2. Name of business _____

Address _____
(street)

_____,NY
(city) (zip)

Telephone: Area Code _____ _____

Name of person to contact _____

Secondary horticulture business areas recommended for interview _____

_____

3. Name of business _____

Address _____
(street)

_____,NY
(city) (zip)

Telephone: Area Code _____ _____

Name of person to contact _____

Secondary horticulture business areas recommended for interview _____

_____

APPENDIX D

TASK LISTS FOR ORNAMENTAL HORTICULTURE

D-1 Retail Florists Business Area Tasks

D-2 Farm and Garden Stores Business Area Tasks

D-3 Landscape Services Business Area Tasks

D-4 Greenhouse Production Business Area Tasks

D-5 Nursery Production Business Area Tasks

D-6 Turf Production Business Area Tasks

D-7 Arborists Services Business Area Tasks

D-8 Wholesale Florists Business Area Tasks

D-9 Public and Private Golf Course Business Area Tasks

APPENDIX D-1

RETAIL FLORISTS BUSINESS AREA TASKS

RETAIL FLORISTS BUSINESS AREA TASKS

A. Sales

1. Describe to customers the purposes and qualities of merchandise for sale
2. Identify customer needs and wants
3. Use telegram and telephone to accept and send customer orders
4. Follow-up sales to determine customer satisfaction
5. Give estimates on costs of flowers and plants for weddings, funerals, etc.
6. Identify horticultural plants
7. Solicit sales by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Interpret plant and flower care instructions to the customer
10. Use supplier advertising materials
11. Use credit systems of payment
12. Label and price mark merchandise
13. Use cash register or other sales recording device
14. Display store merchandise for sale
15. Wrap and package flowers sold
16. Ship and deliver merchandise
17. Stock shelves
18. Explain and demonstrate the use of accessory sales items; candles, vases, cards, candy, etc.
19. Verify customer addresses using directories
20. Identify flower and plant insect and disease infestations
21.
22.
23.

B. Design

1. Selecting flowers and foliage for arrangements
2. Spray painting floral products
3. Decorating rooms with flowers and plants
4. Constructing floral arrangements for store sales
5. Set up displays at funeral homes and churches
6. Display flowers, plants and supplies
7. Design floral arrangements to meet customer specifications
8.
9.
10.

C. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks
5. Perform typing and mailing tasks
6. Keep employee work records
7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit
10. Prepare income tax and other government reports
11. Keep annual depreciation schedule
12. Keep customer credit records
13. Use adding machine and/or other tabulation devices in balancing accounts
14.
15.
16.

D. Inventory

1. Keep current inventory of merchandise for sale
2. Check received merchandise against invoice listings
3. Check invoices for math errors
4. Take annual inventory for tax purposes
5. Store flowers and other plants
6. Arrange for transportation of materials purchased
7. Order replacement and/or new merchandise for sale
8. Prepare advertising materials
9. Keep price lists and catalogs current
10.
11.
12.

E. Maintenance

1. Keep work, storage, and delivery areas neat and clean
2. Clean and sharpen hand tools
3. Keep customer areas neat and clean
4. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery and radiator water levels
5. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points
6. Change oil and grease business vehicle or tractor
7. Electrical repair of light switches and extension cords
8. Paint shelves or display cases
9. Plumbing repair by replacement of worn gaskets or valves
10.
11.
12.

F. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing
12. Establish employee wages, hours, and working conditions
13. Determine business credit needs
14. Locate sources of, and secure credit
15. Determine need for, and purchase comprehensive business insurance
16. Select and purchase equipment and expendables not for sale
17. Determine kinds and amounts of flowers and plants to stock
18. Identify and select producers and suppliers of flowers, plants, and materials
19. Establish and enforce safety regulations
20. Allocate monies in preparing working budget
21. Analyze the business enterprises on cost and return basis
22. Participate in horticulture trade organizations
23. Plan business advertising
24. Negotiate sales contracts
25.
26.
27.

APPENDIX D-2

FARM AND GARDEN STORES BUSINESS AREA TASKS

FARM AND GARDEN STORES BUSINESS AREA TASKS

A. Sales

1. Describe to customers the purposes and qualities of merchandise for sale
2. Identify customer needs and wants
3. Take orders for sales or service by telephone
4. Follow-up sales to determine customer satisfaction
5. Make cost estimates on customer orders
6. Identify horticultural plants
7. Answer customer inquiries by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Prepare advertising materials
10. Use supplier advertising materials
11. Use various types of advertising such as mail, radio, and newspaper ads
12. Label and price mark merchandise
13. Use cash register or other sales recording device
14. Display store merchandise for sale
15. Wrap and/or package merchandise sold
16. Stock shelves
17. Use credit systems of payment
18. Deliver or ship merchandise sold
19. Demonstrate use of equipment and tools
20. Arrange trade-ins and credit terms
21. Make fertilizer and seed calculations for customers based on recommendations
22. Identify and name horticultural plant disease and insect infestations
23. Use recommendations for control of plant disease and insect in advising customer purchases

24. Verify customer addresses using directories
25. Use handout materials in answering customer inquiries
26. Keep price lists and catalogs current
27. Rent equipment to customers
28.
29.
30.

B. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks
5. Perform typing and mailing tasks
6. Keep employee work records
7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit
10. Prepare income tax and other government reports
11. Keep annual depreciation schedule
12. Keep customer credit records
13. Use adding machine and/or other tabulation devices in balancing accounts
14.
15.
16.

C. Inventory

1. Keep current inventory of merchandise for sale
2. Check received merchandise against invoice listings

3. Check invoices for math errors
4. Take annual inventory for tax purposes
5. Store received merchandise
6. Arrange for transportation of materials purchased
7. Order replacement and/or new merchandise for sale
8.
9.
10.

D. Maintenance

1. Keep work, storage, and delivery areas neat and clean
2. Clean and sharpen hand tools
3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery and radiator water levels
4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points
5. Change oil and grease business vehicle or tractor
6. Carpentry repair of display cases and storage shelves
7. Electrical repair of light switches and extension cords
8. Paint display cases and storage shelves
9. Plumbing repair by replacement of worn gasket or valves
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Keep merchandise and customer areas neat and clean
13. Maintain and repair small gas engines
14. Water and care for plants on display and/or storage
15. Calibration of spreading and spraying equipment
16. Follow safety factors in pesticide applications
17.
18.
19.

E. Management

1. Reporting and paying federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing
12. Establish employee wages, hours, and working conditions
13. Determine business credit needs
14. Locate sources of, and secure credit
15. Determine need for, and purchase comprehensive business insurance
16. Select and purchase equipment and expendables not for sale
17. Determine kinds and amounts of equipment to buy and stock
18. Identify and select producers and suppliers of equipment and plants
19. Establish and enforce safety regulations
20. Allocate monies in preparing working budget
21. Analyze the business enterprises on cost and return basis
22. Participate in horticulture trade organizations
23. Plan business advertising
24. Negotiate sales contracts
25. Prepare and implement contracts
26.
27.

APPENDIX D-3

LANDSCAPE SERVICES BUSINESS AREA TASKS

LANDSCAPE SERVICES BUSINESS AREA TASKS

A. Sales

1. Describe to customers the purposes and qualities of plans, flowers, and other plants for sale
2. Identify customer needs and wants
3. Take orders for sales or service by telephone
4. Follow-up landscape projects to determine customer satisfaction
5. Make cost estimates on customer orders
6. Identify horticultural plants
7. Solicit sales by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Prepare advertising materials
10. Use supplier advertising materials
11. Use various types of advertising such as mail, radio, and newspaper ads
12. Write up customer orders
13. Interpret plant and flower care instructions to customers
14. Advise customers on plant pest and disease control
15.
16.
17.

B. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks

5. Perform typing and mailing tasks
6. Keep employee work records
7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit
10. Prepare income tax and other government reports
11. Keep annual depreciation schedule
12. Keep customer credit records
13. Use adding machine and/or other tabulation devices in balancing accounts
14.
15.
16.

C. Inventory

1. Keep current inventory of plants and supplies for sale
2. Check received merchandise against invoice listings
3. Check invoices for math errors
4. Take annual inventory for tax purposes
5. Store received plants and supplies
6. Arrange for transportation of materials purchased
7. Order replacement and/or new plants, equipment, and supplies
8. Keep current inventory of repair parts, fertilizer, seed, chemicals, oil, and gas
9.
10.
11.

D. Maintenance

1. Keep work, storage, and delivery areas neat and clean
2. Clean and sharpen hand tools
3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery, and radiator water levels
4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points
5. Change oil and grease business vehicle or tractor
6. Carpentry repair of storage buildings and repair shop
7. Electrical repair of light switches and extension cords
8. Paint storage structures
9. Plumbing repair by replacement of worn gasket or valves
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Clean and repair dusters and sprayers
13. Service and repair small gas engines (e.g. lawn mowers)
14. Maintain and repair tillers, cultivators, hedge shears, etc.
15.
16.
17.

E. Planning a Landscape

1. Consult with client to find out his needs and wishes
2. Survey the landscape area
3. Locate existing water and sewer lines in landscape area
4. Draw landscape prints and plans
5. Use design principles and techniques that fit the job
6. Determine the time of year to do the job
7. Selection of trees and plants

8. List the plant materials to be used

9. Estimate labor in terms of numbers of men and hours

10. Prepare cost estimate of plan

11. Interpret landscape specifications and designs prepared by landscape architects

12.

13.

14.

F. Prepare the Landscape

1. Determine the time to plant various species

2. Dig drainage ditches

3. Clearing brush and unwanted plants

4. Fell and remove trees

5. Take soil samples

6. Fertilize based on soil tests results

7. Spread and level top soil

8. Prepare flower and shrub beds for planting

9. Dig holes for tree setting

10. Install irrigation systems

11. Add peat moss to soils

12.

13.

14.

G. Planting a Landscape

1. Control weeds and soil insects with chemicals

2. Till soil for lawn seedbed

3. Seed a lawn

4. Add mulch to protect new seedings

5. Plant flowers and shrubs.

6. Plant trees
7. Support woody plants by guying, stalking, or cabling
8. Set stones
9. Install drain tile
10. Construct walls, walks, and outbuildings
11. Construct paved roads and drives
12. Place sod
13. Water new plantings including sod
14. Dispose of paper and refuse
15.
16.
17.

H. Landscape Maintenance

1. Clean grounds of leaves and litter
2. Identify horticultural plant disease and insect infestations
3. Spray chemicals to eliminate weeds, insects, and disease
4. Repair gates, walks, and walls of the grounds
5. Paint fences and outbuildings
6. Clean drainage ditches and culverts
7. Prune and remove dead or unwanted tree branches
9. Scrape tree wounds
10. Apply protective substance to tree wounds or cut surfaces
11. Prepare lawn for reseeding
12. Reseed a lawn
13. Identify and remove poisonous plants
14. Treat plant wounds and disease infestations
15. Repair worn spots in lawns with sod or reseeding
16. Plant annual flowers and set bulbs

17. Take soil samples and send for analysis
18. Apply lime and fertilizer according to soil test
19. Water flower beds and lawns
20. Prune and trim trees and shrubs
21. Mow and trim lawns
22. Remove dead or unwanted trees or shrubs
23. Shovel snow
24. Cultivate flower beds
25. Repair driveways
26. Fell trees
27. Transplant trees and/or shrubs
28. Select and use mulches
29.
30.
31.

I. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing

12. Establish employee wages, hours, and working conditions

13. Determine business credit needs

14. Locate sources of, and secure credit

15. Determine need for, and purchase comprehensive business insurance

16. Select and purchase of equipment and expendables not for sale

17. Determine kinds and amounts of flowers and plants to stock

18. Identify and select producers and suppliers of flowers, plants, and materials

19. Establish and enforce safety regulations

20. Allocate monies in preparing working budget

21. Analyze the business enterprises on cost and return basis

22. Participate in horticulture trade organizations

23. Plan business advertising

24. Negotiate sales contracts

25. Analyze jobs and contracts on cost basis

26. Determine which jobs to contract

27. Analyze jobs and contracts on cost basis

28.

29.

30.

APPENDIX D-4

GREENHOUSE PRODUCTION BUSINESS AREA TASKS

GREENHOUSE PRODUCTION BUSINESS AREA TASKS

A. Preparation of the Medium

1. Test soil for N.P.K. and soluable salts
2. Identify greenhouse soil materials
3. Determine soil mix for specific plant requirements
4. Shred or screen the soil
5. Mix the soil with plant growing materials
6. Sterilize mixed soils
7. Fill benches and pots
8. Mix fertilizer into soil
9. Level the soil surface
10. Spread peat moss on top of soil mix
11. Mark soil for planting
12.
13.
14.

B. Propagation

1. Select the proper time to plant annuals and seasonal varieties
2. Select seed and bulbs
3. Select cuttings and seedling stock
4. Clean and treat seed
5. Sow seed for greenhouse stock
6. Transplant seedlings to pots
7. Bud or graft scions on seedling stock
8. Plant cuttings in flats
9. Pencil label planted specimens

10. Keep seeds and bulbs at proper temperature
11. Identify types of horticultural plants
12.
13.
14.

C. Environmental Control and Culture

1. Water nursery stock
2. Thin nursery stock
3. Prune and thin plants
4. Fertilize plants
5. Test soils for nutrients
6. Pinch potted plants
7. Control temperature with fans and heaters
8. Control humidity with ventilating fans and humidifiers
9. Control both the type and amount of light
10. Force bulbs
11. Force potted plants to bloom at seasonal times
12. Cultivate beds for aeration
13.
14.
15.

D. Disease, Weed, and Pest Control

1. Control weeds with chemicals
2. Use plastic and tools to provide weed control
3. Set traps and/or poisons for pests
4. Fumigate greenhouse
5. Identify and remove diseased plants

6. Control plant insects and diseases with chemicals
7.
8.
9.

E. Harvesting

1. Remove plants from beds
2. Cut flowers and plants
3. Harvest seed
4. Clean and grade seed
5. Bag roots of shrubs
6. Pot flowering plants for sale
7. Label harvested plants by common names
8.
9.
10.

F. Storage and Packaging

1. Bunch, pack, or wrap, flowers and other plants
2. Package seeds
3. Ship seed to storage house
4. Deliver produce to warehouse storage
5. Place cut flowers in environmental storage
6. Label storage bins and bags
7. Remove dead and diseased blooms and plant parts
8. Pack care instructions with plants
9.
10.
11.

G. Sales

1. Describe to customers the purposes and qualities of merchandise for sale
2. Identify customer needs and wants
3. Take orders for sales by telephone
4. Follow-up sales to determine customer satisfaction and as a guide for next years plantings
5. Make cost estimates on customer orders
6. Identify horticultural plants
7. Solicit sales by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Prepare advertising materials
10. Demonstrate arrangement features of products
11. Use various types of advertising such as industry publications and mailing lists
12. Write up customer orders
13. Advise customers on environmental control and shelf life of plants
14. Send plant care instructions to retailers
15. Keep price lists and catalogs current
16.
17.
18.

H. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks
5. Perform typing and mailing tasks
6. Keep employee work records

7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit
10. Prepare income tax and other government reports
11. Keep annual depreciation schedule
12. Keep customer credit records
13. Use adding machine and/or other tabulation devices in balancing accounts
14. Keep greenhouse crop production record
15.
16.
17.

I. Processing and Shipment

1. Quality sort prior to shipment
2. Make out shipping labels and invoices
3. Package orders for shipment
4. Arrange transportation for shipments of plant materials
5. Deliver flowers and/or other plants to wholesaler and/or retailer
6.
7.
8.

J. Inventory

1. Keep current inventory of plants and supplies for sale
2. Check received merchandise against invoice listings
3. Check invoices for math errors
4. Take annual inventory for tax purposes
5. Store received materials and supplies
6. Arrange for transportation of plant materials and supplies purchases

7. Order seed, fertilizer, chemicals, and/or plant materials

8. Keep current inventory of repair parts, fertilizer, seed, and soil mix supplies

9.

10.

11.

K. Maintenance

1. Keep work, storage, and delivery areas neat and clean

2. Clean and sharpen hand tools

3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery and radiator water levels

4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points

5. Change oil and grease business vehicle or tractor

6. Carpentry repair of frames, benches, and other greenhouse structures

7. Electrical repair of light switches and extension cords

8. Paint frames and greenhouse structures

9. Plumbing repair by replacement of work gasket or valves in in the watering system

10. Clean and oil electric motors

11. Order repair parts for vehicles and/or other equipment

12. Glazing windows

13. Maintain and repair small gas engines

14. Clean and repair dusters and sprayers

15. Maintain and repair power tillers and cultivators

16. Service heaters and boilers

17.

18.

19.

L. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing
12. Establish employee wages, hours, and working conditions
13. Determine business credit needs
14. Locate sources of, and secure credit
15. Determine need for, and purchase comprehensive business insurance
16. Select and purchase plants, seeds, fertilizer, and equipment
17. Determine kinds and amounts of flowers and other plants to stock
18. Identify and select producers and suppliers of flowers, plants, and materials
19. Establish and enforce safety regulations
20. Allocate monies in preparing working budget
21. Analyze the business enterprises on cost and return basis
22. Participate in horticulture trade organizations
23. Plan business advertising
24. Negotiate sales contracts
25. Plan varieties to be planted according to demand and availability of seed, bulbs or scion stock

26. Developing relationships with buyers to get new markets and secure sales agreements

27. Arranges with commercial seed houses for supplies

28.

29.

30.

APPENDIX D-5

NURSERY PRODUCTION BUSINESS AREA TASKS

NURSERY PRODUCTION BUSINESS AREA TASKS

A. Preparation of the Medium (Seedbed)

1. Select nursery planting site
2. Take soil samples
3. Lay out space requirements for various varieties
4. Determine fertilizer requirements according to soil test
5. Add chemicals to control weeds and/or soil insects
6. Operate machinery to till soil and distribute lime and fertilizer
7. Dig holes for trees and shrubs (with shovel or power auger)
8. Haul and spread peat moss and other plant materials
9. Plant cover crops
10.
11.
12.

B. Propagation

1. Select time to plant annual and seasonal plants
2. Select seed and transplant stock
3. Clean and treat seed
4. Plant seed
5. Transplant seedlings to the field
6. Plant seed for nursery stock
7. Label planted rows or areas
8.
9.
10.

C. Culture of Plants in the Nursery

1. Water nursery stock
2. Prune and trim plants
3. Test soil
4. Care for plants in containers
5. Thin and space nursery stock
6. Fertilize nursery crops according to soil test
7.
8.
9.

D. Disease, Pest, and Weed Control

1. Cultivate to eliminate weeds
2. Provide chemical weed control
3. Lay plastic to prevent weeds
4. Set traps and poisons for pests
5. Shoot pests
6. Spray crops
7. Identify and remove diseased and dead plants
8. Identify common insect and disease pests of ornamental shrubs
9.
10.
11.

E. Harvesting

1. Dig up trees and shrubbery
2. Ball and burlap roots of trees and shrubs
3. Cut Christmas trees
4. Cut flowers and plants

5. Remove plants from beds
6. Harvest seed
7. Clean and grade seed
8. Label harvested plants
9. Pot plants for retail sale
10.
11.
12.

F. Storage

1. Bunch and pack plants
2. Package seeds
3. Ship seed to storage houses
4. Deliver plants to warehouse storage
5. Label storage bins and bags
6. Remove dead or inferior plants
7. Maintain humidity and temperature requirements in storage facility with fans and heater units
8. Care for overwintering of container group plant materials
9.
10.
11.

G. Sales

1. Describe to customers the purposes and qualities of plants for sale
2. Identify customer needs and wants
3. Take orders for sales by telephone
4. Follow up sales to determine satisfaction and as a guide for determining next years plantings
5. Make cost estimates on customer orders

6. Identify horticultural plants
7. Solicit sales by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Prepare advertising materials
10. Use supplier advertising materials including catalogs
11. Write up customer orders
12. Prepare advertising materials including catalogs
13. Use various types of advertising such as industry publication and mailing lists
14. Advise customers on environmental requirements and shelf life of plants
15. Send plant care instructions to retailers
16.
17.
18.

H. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks
5. Perform typing and mailing tasks
6. Keep employee work records
7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit
10. Prepare income tax and other government reports
11. Keep annual depreciation schedule
12. Keep customer credit records
13. Use adding machine and/or other tabulation devices in balancing accounts

14. Keep nursery crop production records

15.

16.

17.

I. Processing and Shipment

1. Quality sort prior to shipment

2. Make out shipping labels and invoices

3. Package orders for shipment

4. Arrange transportation for shipment of plant materials

5. Deliver plant materials to wholesaler and/or retailer

6. Ship seed to seed houses

7.

8.

9.

J. Inventory

1. Keep current inventory of plants and supplies for sale

2. Check received merchandise against invoice listings

3. Check invoices for math errors

4. Take annual inventory for tax purposes

5. Store received materials and supplies

6. Arrange for transportation of plant materials and supplies

7. Order seed, fertilizer, and/or plant materials

8. Keep current inventory of repair parts, fertilizer, seed, and other supplies

9.

10.

11.

K. Maintenance

1. Keep work, storage, and delivery areas neat and clean
2. Clean and sharpen hand tools
3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery and radiator water levels
4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points
5. Change oil and grease business vehicle or tractor
6. Carpentry repair of storage bins and equipment storage buildings
7. Electrical work on light switches, extensions, and time clocks
8. Paint nursery house and storage buildings
9. Maintain and repair water valves, spigots, thermostats, and pumps
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Clean and repair dusters and sprayers
13. Maintain and repair small gas engines (e.g. lawn mower, rototiller)
14. Maintain and install sprinkler heads, pipe nozzles and other irrigation equipment
15. Service heating pots and boilers
16. Maintain and repair power tillers and cultivators
17.
18.
19.

L. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees

6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing
12. Establish employee wages, hours, and working conditions
13. Determine business credit needs
14. Locate sources of, and secure credit
15. Determine need for, and purchase comprehensive business insurance
16. Select and purchase plants, fertilizer, and equipment
17. Determine kinds and amounts of flowers and plants to stock
18. Identify and select producers and suppliers of flowers, plants, and materials
19. Establish and enforce safety regulations
20. Allocate monies in preparing working budget
21. Analyze the business enterprises on cost and return basis
22. Participate in horticulture trade organizations
23. Plan business advertising
24. Negotiate sales contracts
25. Developing relationships with buyers to get new markets and secure sales agreements
26.
27.
28.

APPENDIX D-6

TURF PRODUCTION BUSINESS AREA TASKS

TURF PRODUCTION BUSINESS AREA TASKS

A. Preparation of the medium

1. Drain the turf site
2. Lay out space requirements for various varieties
3. Take soil samples
4. Determine fertilizer requirements based on soil tests
5. Select and spread topsoil
6. Operate machinery to till soil and distribute lime and fertilizer
7. Level seedbed
8.
9.
10.

B. Propagation and Growth

1. Select time to plant
2. Select seed
3. Clean and treat seed
4. Mix seed
5. Till the topsoil
6. Sow grass seed
7. Add mulch to protect seeding
8. Roll the seeded ground
9. Water the new seeding
10. Mow and trim new seeding
11. Remove the mulch from seeding
12. Irrigate sod or seeding
13.
14.
15.

C. Disease, Pest, and Weed Control

1. Cultivate the seed site prior to planting
2. Lay plastic
3. Shoot pests
4. Operate sprayers
5. Trap rodents and insects
6. Poison rodents and insects
7. Identify and remove weeds
8. Add chemicals to control weeds and/or soil insects
9.
10.
11.

D. Harvesting

1. Lift and roll sod with machine
2. Load sod on trucks
3. Label harvested sod
4.
5.
6.

E. Sales

1. Describe to customers the uses of different varieties of sod
2. Identify customer needs and wants
3. Take orders for sales by telephone
4. Follow-up sales to determine customer satisfaction and as a guide for determining next years plantings
5. Make cost estimates or customer orders
6. Identify horticultural plants

7. Solicit sales by telephone

8. Use effective interpersonal relationships in dealing with customers

9. Prepare advertising materials

10. Keep price lists current

11. Use various types of advertising such as industry publications and mailing lists

12. Write-up customer orders

13. Advise customers on establishment and care of sod

14. Send sod care instructions to retailers

15. Deliver sod to retailer or wholesaler

16. Ship sod to landscapers or contractors

17.

18.

19.

F. Records

1. Keep records of receipts and expenses

2. Make out and mail bills to collect accounts due

3. Check credit references of customers

4. Perform filing tasks

5. Perform typing and mailing tasks

6. Keep employee work records

7. Prepare employee payroll

8. Pay accounts payable

9. Assist in records audit

10. Prepare income tax and other government reports

11. Keep annual depreciation schedule

12. Keep customer credit records

13. Use adding machine and/or other tabulation devices in balancing accounts

14. Keep sod production records

15.

16.

17.

G. Inventory

1. Keep current inventory of sod for sale

2. Check received merchandise against invoice listings

3. Check invoices for math errors

4. Take annual inventory for tax purposes

5. Store received materials and supplies

6. Arrange for transportation of materials purchased

7. Order seed, fertilizer, and chemicals

8. Keep current inventory of repair parts, seed, fertilizer, and chemicals

9.

10.

11.

H. Maintenance

1. Keep work, storage, and deliver areas neat and clean

2. Clean and sharpen hand tools

3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery, and radiator water levels

4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points

5. Change oil and grease business vehicle or tractor

6. Carpentry repair of storage structures

7. Electrical repair of light switches and extension cords

8. Paint storage structures
9. Plumbing repair of worn gaskets or valves
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Maintain and repair small gas engines
13. Maintain and install sprinkler heads, pipe nozzles, and other irrigation equipment
14. Maintain and repair water valves, spigots, thermostats, and pumps
15. Maintain and repair tillers and cultivators
16. Clean and repair dusters and sprayers
17. Service and repair of sod cutters
18. Service and repair of mowers
19.
20.
21.

I. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing

12. Establish employee wages, hours, and working conditions

13. Determine business credit needs

14. Locate sources of, and secure credit

15. Determine need for, and purchase comprehensive business insurance

16. Select and purchase seed, fertilizer, and equipment

19. Establish and enforce safety regulations

20. Allocate monies in preparing working budget

21. Analyze the business enterprises on cost and return basis

22. Participate in horticulture trade organizations

23. Plan business advertising

24. Negotiate sales contracts

25. Develop relationships with buyers to get new markets and secure sales agreements

26. Plan varieties to be planted according to demand and availability of seed

27. Select sod field on farm

28.

29.

30.

APPENDIX D-7

ARBORISTS SERVICES BUSINESS AREA TASKS

ARBORISTS SERVICES BUSINESS AREA TASKS

A. Sales

1. Describe to customers the purposes and characteristics of tree varieties
2. Identify customer needs and wants
3. Take orders for sales or service by telephone
4. Follow-up sales to determine customer satisfaction
5. Make cost estimates on customer orders
6. Identify types of trees
7. Solicit sales by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Prepare advertising materials
10. Use supplier advertising materials
11. Use various types of advertising such as mail, radio, and newspaper ads
12. Interpret tree care instructions to customers
13. Write-up customer orders
14. Advise customers on tree pest and disease control

B. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks
5. Perform typing and mailing tasks
6. Keep employee work records
7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit

10. Prepare income tax and other government reports

11. Keep annual depreciation schedule

12. Keep customer credit records

13. Use adding machine and/or other tabulation devices in balancing accounts

14. Keep maintenance records on power equipment

15.

16.

17.

C. Inventory

1. Keep current inventory of plants and materials

2. Check received merchandise against invoice listings

3. Check invoices for math errors

4. Take annual inventory for tax purposes

5. Store spare parts, oil, and gas

6. Keep current inventory of spare parts, oil, and gas

7. Order replacement and/or new merchandise for sale

8.

9.

10.

D. Maintenance

1. Keep work, storage, and delivery areas neat and clean

2. Clean and sharpen hand tools

3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery, and radiator water levels

4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points

5. Change oil and grease business vehicle or tractor

6. Carpentry repair of storage structures

7. Electrical repair of light switches and extension cords
8. Paint storage buildings
9. Plumbing repair by replacement of worn gaskets or valves
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Maintain and repair small gas engines (e.g. lawn mowers)
13. Care of climbing equipment
14. Clean and repair dusters and sprayers
15. Maintain and repair power trimmers and tree removers
16. Plumbing maintenance, replacing worn gaskets and valves
17.
18.
19.

E. Preparation and Planting Trees

1. Determine tree variety to plant
2. Identify time of year to plant
3. Dig holes to set trees
4. Set trees
5. Take soil tests
6. Lime and fertilize trees at planting
7. Water set trees
8. Dig up trees to be transplanted
9. Ball trees to be shipped
10. Support newly planted trees by guying or staking
11.
12.
13.

F. Tree Care and Maintenance

1. Diagnose tree pests, diseases and other disorders
2. Spray trees for pests and disease
3. Prune and trim shade trees
4. Trim trees for utility line clearance
5. Providing winter protection for trees
6. Remove broken and storm damaged limbs
7. Fill tree cavities
8. Safe guard trees in parking lots
9. Remove brush and weeds
10. Use block and tackle to remove trees
11. Fell trees
12. Cord wood to sell
13. Remove tree stumps
14. Haul and dispose of branches to refuse
15. Climb trees
16. Cable and brace weak trees or limbs
17. Testing soil
18. Fertilize established trees
19. Control undesirable growth with herbicides or growth retardants
20. Identify trees
21. Operate cherry picker
22.
23.
24.

G. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws

3. Administer soical security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing
12. Establish employee wages, hours, and working conditions
13. Determine business credit needs
14. Locate sources of, and secure credit
15. Determine need for and purchase comprehensive business insurance
16. Select and purchase of equipment and expendables not for sale
17. Determine kinds and amounts of plants to stock
18. Identify and select producers and suppliers of plants, and equipment
19. Establish and enforce safety regulations
20. Allocate monies in preparing working budget
21. Analyze the business enterprises on cost and return basis
22. Participate in horticulture trade organizations
23. Plan business advertising
24. Negotiate sales and/or service contracts
25. Analyze jobs and contracts on a cost basis
26. Determine which jobs to contract
27. Develop relationships with contractors to obtain jobs and sub-contracts
28.
29.
30.

APPENDIX D-8

WHOLESALE FLORISTS BUSINESS AREA TASKS

WHOLESALE FLORISTS BUSINESS AREA TASKS

A. Sales

1. Describe to customers the purposes and qualities of merchandise for sale
2. Identify customer needs and wants
3. Take orders for sales by telephone
4. Follow-up sales to determine customer satisfaction
5. Make cost estimates on customer orders
6. Identify horticultural plants
7. Solicit sales by telephone
8. Use effective interpersonal relationships in dealing with customers
9. Prepare advertising materials
10. Use supplier advertising materials
11. Use various types of advertising such as mail, radio, and newspaper ads
12. Use credit systems of payment
13. Send plant and flower care instructions to retailers
14. Verify customer addresses using directories
15. Write up customer orders for packing personnel
16.
17.
18.

B. Processing and Shipment

1. Make up customer orders
2. Presort incoming plant materials
3. Check received goods for spoilage and damage
4. Quality sort prior to shipment

5. Package orders for shipment
6. Make out bus tickets, labels, and invoices for shipping
7. Arrange transportation for shipments sold
8. Check storage temperatures of refrigeration units
9.
10.
11.

C. Records

1. Keep records of receipts and expenses
2. Make out and mail bills to collect accounts due
3. Check credit references of customers
4. Perform filing tasks
5. Perform typing and mailing tasks
6. Keep employee work records
7. Prepare employee payroll
8. Pay accounts payable
9. Assist in records audit
10. Prepare income tax and other government reports
11. Keep annual depreciation schedule
12. Keep customer credit records
13. Use adding machine and/or other tabulation devices in balancing accounts
14. Post sales on tabulation sheets by variety (to predict future demand)
15.
16.
17.

D. Inventory

1. Keep current inventory of plants and supplies for sale
2. Check received merchandise against invoice listings
3. Check invoices for math errors
4. Take annual inventory for tax purposes
5. Store received plants and other merchandise
6. Arrange for transportation of materials purchased
7. Order replacement and/or new plants and supplies for sale
8.
9.
10.

E. Maintenance

1. Keep work, storage, and delivery areas neat and clean
2. Clean and sharpen hand tools
3. Light maintenance of business vehicle or tractor - oil level, tire pressure, battery and radiator water levels
4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points
5. Change oil and grease business vehicle or tractor
6. Carpentry repair of storage areas
7. Electrical repair of light switches and extension cords
8. Paint storage areas
9. Plumbing repair by replacement of worn gaskets or valves
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Maintain refrigeration units
13. Water and care for plants in storage
14. Care for common cut flowers

15. Keep night watch on refrigeration units

16.

17.

18.

F. Management

1. Report and pay federal, state, and local taxes
2. Understand and comply with business laws
3. Administer social security and other employee benefit programs
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Perform personnel actions such as promoting or firing
12. Establish employee wages, hours, and working conditions
13. Determine business credit needs
14. Locate sources of, and secure credit
15. Determine need for, and purchase comprehensive business insurance
16. Select and purchase equipment and expendables not for sale
17. Determine kinds and amounts of flowers and plants to stock
18. Identify and select producers and suppliers of flowers, plants, and materials
19. Establish and enforce safety regulations
20. Allocate monies in preparing working budget
21. Analyze the business enterprises on cost and return basis

22. Participate in horticulture trade organizations

23. Plan business advertising

24. Negotiate sales contracts

25. Develop relationships with buyers to get new markets and secure sales agreement

26.

27.

28.

APPENDIX D-9

PUBLIC AND PRIVATE GOLF COURSE BUSINESS AREA TASKS

PUBLIC AND PRIVATE GOLF COURSE BUSINESS AREA TASKS

A. Maintenance of Greens

1. Mow and trim greens
2. Move the cup
3. Water greens
4. Replace sod
5. Identify weeds, insects, and diseases
6. Remove weeds and diseased turf
7. Apply chemicals to control insects and fungus
8. Apply chemicals to control weeds
9. Testing soils for nutrient content
10. Fertilize based on soil test
11.
12.
13.

B. Maintenance of Fairways and Traps

1. Add and rake sand in traps
2. Mow and trim fairways
3. Water fairways
4. Clean drains
5. Reseed worn spots on fairways
6. Repair divots
7. Spray chemicals to control weeds, insects, and disease
8. Fertilize based on soil test
9. Set boundaries
10. Maintain paths and signs

11. Trim trees and shrubs

12.

13.

14.

C. Records

1. Keep employee time record

2. Keep records of fertilizer and chemicals applied

3.

4.

5.

D. Inventory

1. Keep current inventory of merchandise for sale; seed, fertilizer, and chemicals

2. Check received merchandise against invoice listings

3. Check invoices for math errors

4. Take annual inventory for tax purposes

5. Store received seed, fertilizer, and chemicals

6. Arrange for transportation of materials purchased

7. Order replacement and/or new seed, fertilizer, and chemicals

8.

9.

10.

E. Maintenance

1. Keep work and storage areas neat and clean

2. Clean and sharpen hand tools

3. Light maintenance of business vehicles or tractor - oil level, tire pressure, battery, and radiator water levels

4. Minor tune-up of business vehicle or tractor by replacement of sparkplugs and ignition points

5. Change oil and grease business vehicle or tractor
6. Carpentry repair of storage buildings and repair shop
7. Electrical repair of light switches and extension cords
8. Paint storage buildings, benches, and repair shop
9. Plumbing repair by replacement of worn gaskets or valves
10. Clean and oil electric motors
11. Order repair parts for vehicles and/or other equipment
12. Service and repair of irrigation system
13. Maintenance and repair of small gas engines (e.g. lawnmowers, edgers)
14. Clean and sharpen mower blades
15. Clean and repair dusters and sprayers
16.
17.
18.

F. Management

2. Understand and comply with business laws
4. Identify labor needs
5. Recruit employees
6. Interview and select employees
7. Designate employee work assignments
8. Supervise employees
9. Train new employees
10. Evaluate employee performance
11. Recommend personnel actions such as promoting or firing
18. Identify and select producers and suppliers of seed, fertilizer, and chemicals
19. Establish and enforce safety regulations

20. Allocate monies in preparing working budget

22. Participate in horticulture trade organizations

23.

24.

25.

APPENDIX E

BASIC QUESTIONNAIRE COMPONENTS

PART I - QUESTIONNAIRE LONG FORM

PART II - QUESTIONNAIRE EXPLANATION KEY

PART III - QUESTIONNAIRE CODING INSTRUCTIONS

APPENDIX E
(PART I)

INSTRUMENT FORM

For Coding Only
(1) (2) : (3) (4) (5) : X (6)

TP - 1

TASK NUMBER	TASK STATEMENT	(✓) Performed	Equipment	Strength	Physical Activity	Supervision	Association With Others	Working Conditions	PERFORMANCE LEVEL: Quantitative (Units/Hr)	PERFORMANCE LEVEL: Qualitative
	A. PREPARATION OF THE MEDIUM		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
6 2 6 9	Drain the turf site									
(7) (8) (9) (10)	X 0 0 2 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)
6 2 4 3	Lay out space requirements for various varieties		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
(7) (8) (9) (10)	X 0 0 3 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)
6 1 2 7	Take soil samples		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
(7) (8) (9) (10)	X 0 0 4 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)
6 2 2 4	Determine fertilizer requirements based on soil tests		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
(7) (8) (9) (10)	X 0 0 5 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)
6 2 7 0	Select and spread topsoil		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
(7) (8) (9) (10)	X 0 0 6 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)
6 2 4 6	Operate machinery to till soil and distribute lime and fertilizer		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
(7) (8) (9) (10)	X 0 0 7 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)
6 2 7 1	Level seedbed		H P B	S L M H V	C K H T S	N S C V	A P C	I O B C H W N H F	— — — E V	E I C P
(7) (8) (9) (10)	X 0 0 8 X (11) (12) (13) (14) (15)	1 (16)	(17)	(18)	(19) (20) (21) (22) (23)	(24)	(25)	(26) (27) (28) (29) (30) (31) (32)	(33) (34) (35) (36)	(37)

APPENDIX E
(PART II)

QUESTIONNAIRE EXPLANATION KEY HORIZONTAL
AND ANGLED VERSIONS

Angled version was placed at the top of the instrument where employers marked the instrument

The horizontal key was used where the interviewers read the tasks to the employer who then selected his response from the key.

KEY FOR ORNAMENTAL HORTICULTURE TASK ANALYSIS

Check ( ) If Performed

HAND; POWER; BOTH

SEDENTARY; LIGHT (to 20 lbs.); MEDIUM (to 50 lbs.)
HEAVY (to 100 lbs.); VERY HEAVY (over 100 lbs.)

CLIMBING and/or BALANCING

KNEELING, STOOPING, CRAWLING, and/or CROUCHING

HANDLING, FINGERING, REACHING, and/or FEELING

TALKING and/or HEARING

SEEING, DEPTH PERCEPTION, COLOR VISION and/or ACUITY

NONE; SOME; CONSTANT; VARIES

ALONE; PROXIMITY OTHERS; COOPERATION OTHERS

INSIDE; OUTSIDE; BOTH

COLD and/or TEMPERATURE CHANGE

HOT and/or TEMPERATURE CHANGE

WET and/or HUMID

NOISE and/or VIBRATIONS

HAZARDS -- MECHANICAL, ELECTRICAL, and/or BURNS

FUMES, ODORS, DUST, and/or POOR VENTILATION

ACTUAL UNITS/Hr

EMPLOYER JUDGMENT; VARIES BY CONDITIONS

EMPLOYER JUDGMENT; INDUSTRY STANDARDS; CUSTOMER SATISFACTION

KEY FOR ORNAMENTAL HORTICULTURE TASK ANALYSIS

PERFORMED	Check (✓) if performed by someone in your business
EQUIPMENT	Hand; Power; Both
STRENGTH	Sedentary; Light (to 20 lbs.); Medium (to 50 lbs.); Heavy (to 100 lbs.); Very Heavy (over 100 lbs.)
PHYSICAL ACTIVITY	Climbing, and/or balancing Kneeling, stooping, crawling, and/or crouching Handling, fingering, reaching, and/or feeling Talking, and/or hearing Seeing, depth perception, color vision, and/or acuity
SUPERVISION	None; Some; Constant; Varies
ASSOCIATION WITH OTHERS	Alone; Proximity to others; Association with others
WORKING CONDITIONS	Inside; Outside; Both Cold and/or temperature change Hot and/or temperature change Wet and/or humid Noise and/or vibrations Hazards -- mechanical, electrical and/or burns Fumes -- odors, dust, and/or poor ventilation
PERFORMANCE LEVEL	
Quantitative	Actual units per hour or Employer judgment; Varies with conditions
Qualitative	Employer judgment; Industry standards; Customer satisfaction

APPENDIX E
(PART III)

QUESTIONNAIRE CODING INSTRUCTIONS

CODING KEY TASK ANALYSIS IN ORNAMENTAL HORTICULTURE QUESTIONNAIRE

CARD #1 Only

Column	Items and Categories	Page #	Quest. #
1 - 2	Computer Sequence Number 01-99 (Code actual number)		
3 - 5	Geographical Location See three digit code from Division of Employment (Code actual number)		
6	Blank (Precode on all questionnaires prior to duplication)		
7	Business Area RF 1 - Retail Florist FG 2 - Farm and Garden supply stores LS 3 - Landscape Services GH 4 - Greenhouse Production NU 5 - Nursery Production TP 6 - Turf Production (sod farms) AS 7 - Arborists Services WF 8 - Wholesale Florists GC 9 - Gold Courses (public and private)		
8 - 11	Blank (Precode on all questionnaires prior to duplication)		
12 - 14	Computer Card Number Code actual number (i.e. 001) (Precode on all questionnaires prior to duplication)		
15 - 17	Number of peak full-time workers in business area Code actual number (001-999)		
18 - 20	Number of peak seasonal workers in business area Code actual number (001-999)		
21 - 23	Number of peak part-time workers in business area Code actual number (001-999)		

CODING KEY TASK ANALYSIS IN ORNAMENTAL HORTICULTURE
QUESTIONNAIRE

CARD #1 Only

Column	Items and Categories	Page #	Quest#
24 - 26	Number of low full-time workers in business area Code actual number (001-999)		
27 - 29	Number of low seasonal workers in business area Code actual number (001-999)		
30 - 32	Number of low part-time workers in business area Code actual number (001-999)		
33 - 35	Number of new employees hired in 1970 to fill vacated and/or new positions Code actual number (001-999)		
36	Product Specialization (e.g.) Nursery produces only roses Yes Code 1 No Code 2		
37	Interest in trying recruitment instrument Yes Code 1 No Code 2		

CODING KEY TASK ANALYSIS IN ORNAMENTAL HORTICULTURE QUESTIONNAIRE

CARD #2 (preliminary information)

Column	Items and Categories	Page #	Quest#
1 - 2	Computer Sequence Number 01-99 Code actual number		
3 - 5	Geographical Location See three digit location code from Division of Employment Code actual number		
6	Blank Precode on all questionnaires prior to duplication		
7 - 10	Task Number Code actual number Precode on all questionnaires prior to duplication NOTE: The number in column 7 indicates the business area of the task: 1 - Retail Florists 2 - Farm and Garden supply stores 3 - Landscape Services 4 - Greenhouse Production 5 - Nursery Production 6 - Turf Production (sod farms) 7 - Arborists Services 8 - Wholesale Florists 9 - Gold Courses (public and private)		
11	Blank Precode on all questionnaires prior to duplication		
12 - 14	Computer Card Number Code actual number Precode on all questionnaires prior to duplication		
15	Blank Code on all questionnaires prior to duplication		

CODING KEY TASK ANALYSIS IN ORNAMENTAL HORTICULTURE QUESTIONNAIRE

For all cards relating task information

Column	Items and Categories	Page #	Quest#
16	Is the task performed Yes, Code 1; No, Code 2		
17	Equipment used in task performance Hand tools Code 1 Power tools Code 2 Both Code 3		
18	Strength required in task performance Sedentary Code 1 Light (to 20 lbs.) Code 2 Medium (to 50 lbs.) Code 3 Heavy (to 100 lbs.) Code 4 Very Heavy (over 100 lbs.) Code 5		
19 - 23	Description of physical activity in task performance Yes, Code 1; No, Code 2		
19	Climbing, balancing		
20	Kneeling, stooping, crawling, crouching		
21	Handling, reaching, fingering, feeling		
22	Talking, hearing		
23	Seeing, depth perception, color vision		
24	Supervision of the task None Code 1 Some Code 2 Constant Code 3 Varies Code 4		
26 - 32	Working conditions of the task		
26	Inside (75% or more) Code 1 Outside (75% or more) Code 2 Inside and Outside Code 3 Yes, Code 1; No, Code 2		
27	Cold, temperature change		
28	Heat, temperature change		
29	Wet, humid		
30	Noise, vibration		
31	Hazards, mechanical, electrical, burns		
32	Fumes, odors, dust, poor ventilation		

CODING KEY TASK ANALYSIS IN ORNAMENTAL HORTICULTURE
QUESTIONNAIRE

For all cards relating task information

Column	Items and Categories	Page #	Quest#
33 - 36	Quantitative Performance levels		
33 - 35	Physical production in units per hour		
36	Employer judgment — Code 1 Level varies with circumstances — Code 2		
37	Qualitative performance		
	Meets employer judgment — Code 1 Meets industry standard — Code 2 Satisfies customer — Code 3		
	NOTE: If no response -- Code 9		

APPENDIX F

QUESTIONNAIRE PRELIMINARY INFORMATION SHEET

For Coding Only (Card #1)

(1) (2) (3) (4) (5):

(6) X
(7) ___
(8) X
(9) X
(10) X
(11) X
(12) 0
(13) 0
(14) 1

New York State College of Agriculture
Cornell University
Ithaca, New York 14850

Task Analysis and Recruitment in Agribusiness

_____
(Business Area Interviewed)

General Information

1. Name of Business Firm _____ P-FT (15)(16)(17)

Address _____
(street) (city)

P-S (18)(19)(20)

_____ _____ _____
(state) (zip code) (telephone)

2. Name of person(s) interviewed Title

P-PT (21)(22)(23)

_____ _____

_____ _____

3. Number of persons employed in 1970 in ornamental horticulture

L-FT (24)(25)(26)

	Year Round Full-Time	Seasonal Full-Time	Part-Time
Peak	_____	_____	_____
Low	_____	_____	_____

L-S (27)(28)(29)

4. Total number of new employees hired in 1970 to fill vacated and/or new positions.

L-PT (30)(31)(32)

5. Any product specialization in this business area?

___ ___ (1) Yes (specify) _____ NEW (33)(34)(35)

___ ___ (2) No (36)

Would you be interested in cooperating with the New York State Division of Employment to try out the recruitment instrument that will be developed from this study? (37)

___ ___ (1) Yes ___ ___ (2) No

Comments _____

APPENDIX G

INTERVIEWERS MATERIALS

NEW YORK STATE COLLEGE OF AGRICULTURE
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
CORNELL UNIVERSITY
ITHACA, N. Y. 14850

DEPARTMENT OF EDUCATION
STONE HALL

144

January 13, 1971

Wo Whom It May Concern:

This letter is to introduce Mr. James Legacy as a Research Assistant in the College of Agriculture at Cornell University Task Analysis Study in Ornamental Horticulture.

Your assistance in this study will be appreciated.

Sincerely yours,

William E. Drake, Professor
Agricultural Education

Arthur L. Berkey
Assistant Professor
Agricultural Education

br

DIRECTIONS TO COOPERATIVE EXTENSION OFFICES

Albany Co. — William H. McEvoy (518-459-4010)

Thruway to Exit 24 to Northway (Rte. 87). Take first Exit (Albany, Rte. 5) on Northway and turn right (east) on Rte. 5 which is Central Avenue. Follow Central Avenue 0.7 miles to Extension office on left side (1297 Central Avenue - Brick building with "The Bank" sign)

Wayne Co. — Raymond C. Nichols (315-483-2711)

New York Thruway to Exit 42. North on State Road 14 to Alton where Rte. 14 and old Rte. 104 intersect. Extension building is on corner of intersection.

Erie Co. — Irvin A. Gillow (716-652-5400)

New York Thruway to Exit 54 (West Seneca). East on Aurora Expressway (400) to end. Right on Maple Road. Left off Maple on U.S. 16 (Main Street) two blocks and office is on left side across from Aurora High School.

Monroe Co. — Kirkwood Personius (716-473-5335)

New York Thruway to Exit 45 (Victor). Follow Rte. 490 into Rochester past the Culver Road and Monroe Exits to Goodman St. Exit. Turn left on Goodman Street (south) to Highland. Turn right on Highland to 249 which is a two story brick building on the left.

NOTE: Mr. Personius suggests that we include C. W. Stuart Nurseries in our sample.

Oneida Co. — Alton W. Keller (315-732-4183)

Take Rte. 81 to Rte. 20. Follow Rte. 20 East to Rte. 12B (see Oriskany Falls sign). Turn left on Rte. 12B through Clinton to N.S. Utica Artial. Turn North on artial and follow signs to New Hartford Exit. Exit at New Hartford sign off artial onto another artial (follow New Hartford signs) to New Hartford. At traffic light turn left on Campion Road. Follow Campion Road across Genesee Road (Campion Road now turns into Oxford Road) and the extension office is first building on the left behind the drug store.

Onondaga Co. — Walter G. Newhauser (315-473-6667)

Take Rte. 81 to downtown (Adams Street) Exit in Syracuse. Take first left on Harriston Street. Take Harrison Street to Salina Street. Left on Salina Street to left on Erie Street (You are now at Clinton Square). The extension office is in the main post office building in Clinton Square (i.e. 380 Federal Building)

Nassau Co. — William Titus (516-746-7820)

Follow 17 to 87 New York Thruway to 95 to througs-neck bridge to Long Island Parkway to Willis Street. Exit. Right on Willis Street to Mineola and extension office is on right at 33 Willis Street. (Two story brick building on right), extension second floor.

Orange Co. — Jan Jensen (914-343-1105)

Take Rte. 17 to Middletown Exit. Turn right to Middletown past Lloyd's Department Store. Turn left at first light on Wisner. Extension office in Farm and Home Center on left in fairgrounds (approximately 3/4 mile down Wisner.

Dutchess Co. — James Ashton (914-677-8296)

Take Rte. 17 to 17K (before Middletown). Left on 17K to Newburg (approximately 15 miles). At traffic light before Newburg, turn left to Interstate 84 and bridge sign. Go approximately 1/2 mile to 184. East on 184 across bridge to Togonic Parkway (approximately 12 miles). Go north on Togonic Parkway to Rte. 44 (Milbrook sign) turn right. Follow Rte. 44 for 1 1/2 miles and Farm and Home Center is on the left (one story red brick building).

TASK ANALYSIS STUDY IN ORNAMENTAL HORTICULTURE

A Task Analysis Study in Ornamental Horticulture is being conducted by Staff in the College of Agriculture at Cornell University. The study is funded by the Division of Employment, New York State Department of Labor. Officers of the New York State Arborists Association have already been contacted regarding the study.

Objectives of the Study

The study will identify the tasks performed in the industry, to include the conditions under which the tasks are done and the level of satisfactory performance required. This task analysis information will then be used to develop a recruitment instrument whereby employers can check the tasks that the person they wish to employ can perform. The instrument will also be used by the New York State Employment Service to determine the horticultural skills of persons seeking employment.

Special Involvement by the Florists

To date, the Horticultural Trade Organizations have been very cooperative in supplying lists of businesses from which we can draw our sample of arborists to interview. The special involvement requested from arborists is to participate should their establishment be included in the sample of arborists to be interviewed. In the interview, the arborist would verify tasks, describe conditions under which these tasks are performed, and list the required performance level for the tasks.

Cornell Staff conducting the study wish to express appreciation to the officers of the New York State Arborists Association for their cooperation in the study to date.

PROCEDURE FOR SELECTION OF ORNAMENTAL HORTICULTURE BUSINESSES FOR INTERVIEW

Cooperative Extension Agents with primary responsibility for ornamental horticulture will be requested to select businesses for interview using the following procedure:

1. Schedule an appointment with the ornamental horticulture agent(s).

2. Explain the purpose of the study -- to develop a list of ornamental horticulture tasks which may be used by employers as a recruitment instrument, i.e. the employer would check the tasks the worker he wishes to hire would need to be able to perform under given conditions and at a specified performance level.

3. Hand out and explain the "Instruction Sheet for Selection of Ornamental Horticulture Businesses to be Interviewed," and the form for listing businesses selected.

4. Collect completed lists of businesses and inspect to be sure that information is complete. Thank agents for their assistance.

5. Ask if agents would be willing to have their name used when the telephone contact to schedule the interview is made.

6. Contact businesses listed by agents by telephone to schedule the interview. Use the telephone credit card provided for any long distance calls. Begin with the first choice listed for each interview. Use the second and third choice businesses as necessary.

INSTRUCTION SHEET FOR SELECTING ORNAMENTAL HORTICULTURE BUSINESSES TO BE INTERVIEWED

Background

The ornamental horticulture industry was divided into the nine business areas of (1) Retail Florists, (2) Farm and Garden Supply Stores, (3) Landscape Services, (4) Greenhouse Production, (5) Nursery Production, (6) Turf Production, (7) Arborist Services, (8) Wholesale Florists, and (9) Golf Courses -- public and private.

The geographical distribution of the interviews scheduled is based on the concentration of the nine business areas in the various counties and boroughs.

In _____ County (Borough) the interviews scheduled are:

Business Area	Number of Interviews Scheduled
1. Retail Florists	____
2. Farm and Garden Supply Stores	____
3. Landscape Services	____
4. Greenhouse Production	____
5. Nursery Production	____
6. Turf Production	____
7. Arborist Services	____
8. Wholesale Florists	____
9. Golf Courses (public and private)	____

For each interview scheduled, please list on the attached form your first, second, and third choice of businesses for interview. Select businesses from the lists provided, and/or your mailing lists, that best meet the following criteria:

1. Engaged primarily in ornamental horticulture -- receiving 50 percent or more of gross income or financial support from the sale of ornamental products or services, or the use of ornamental products and/or services for decorative or recreational purposes (not for food or fiber).
2. The type of ornamental horticulture business is over 50 percent in the business area listed.
3. Use up-to-date and representative business practices and equipment.
4. Participate actively in the horticulture trade organization in their business area.
5. Have a high potential for recruiting ornamental horticulture workers as evidenced by:
   a. Employment of the largest number of full-time and/or seasonal workers as compared with similar firms.
   b. Experiences a high degree of business growth as compared to similar firms.
   c. Recruitment of the largest number of workers during the past year as compared to similar firms.
6. Cooperative and receptive to interview.

LIST OF ORNAMENTAL HORTICULTURE BUSINESSES FOR INTERVIEW FORM

County or Borough _____

Name of Cooperative Extension Agent _____

Address _____ N.Y. _____
(street) (city) (zip code)

Telephone _____

Business Area	Rank Business Recommended for Interview (PLEASE PRINT)
_____	1. Name of business _____ Address _____ (street) _____ N.Y. _____ (city) (zip code) Telephone _____ Name of person to contact _____ Secondary horticulture business areas _____ _____
_____	2. Name of business _____ (Repeat same as for (1) above)
_____	3. Name of business _____ (Repeat same as for (1) above)

INTERVIEWERS GUIDE

I. Scheduling the interview by telephone:

This is _____ from the College of Agriculture at Cornell University. I'm in the area interviewing different kinds of ornamental horticulture businesses for our horticulture task analysis study. You were suggested by Cooperative Extension Agent _____ as a person to contact to request an
(name of agent)
interview in the areas of _____, _____, _____, (business areas). Our study has the endorsement of Cooperative Extension and _____ (horticulture trade organization if applicable).

If possible, I would like to schedule about _____ hour interview with you sometime on _____.
(date and time)

(Assuming a Positive Response)

Is _____ the correct address? Do you
(address of business from agent)
have any suggestions as far as parking is concerned?

Thank you Mr. _____, I will be looking forward to seeing you on _____.
(date, time, and location of interview)

NOTE: We may want to consider asking the Extension Office in the area to serve as a clearing house in case an emergency comes up and the interviewee cannot hold the interview since we will have no telephone.

II. During the Interview

1. Verify the business name, address, and telephone number of the business (recorded prior to the interview).

2. Record full name of the person(s) interviewed.

3. Record interviewee'(s) title using commonly accepted titles such as manager, supervisor, assistant manager, etc.

4. Record the highest and lowest number of full-time, part-time and seasonal workers employed during 1970. Full-time constitutes 35 or more hours per week. Part-time is less than 35 hours.

5. Record the total number of new employees hired during 1970. These may be to fill vacated and/or new positions.

6. Record if there is any product specialization in the business area (e.g. roses in the greenhouse production area).

7. Define and explain the meaning of the task to the respondent:

   Task: A task is a logically related set of actions required for the completion of a job objective.[1] A group of acts or activities that generally occur close together and have common purposes; it forms a logical and necessary part of the performance of a duty.[2]

8. Explain job conditions and performance level for tasks.(See key for conditions and performance levels).

9. Show and explain instrument to respondents:

   a. Tasks performed and indicated by a check in the performance column.

   b. The key is used with job conditions and performance level

   c. Job conditions presented are indicated by drawing a slash through one or more letters which represent the response indicated on the key.

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1. Majer, Robert F. and Kenneth M. Beach, Jr. "Developing Vocational Instruction." Fearon Publishers, Palo Alto, California, 1967, p. 10.

2. Smith, Robert G., Jr. "The Development of Training Objectives." Research Bulletin II, The George Washington University Human Resources Office.

d. Performance level

1. Quantitative -- write in the number of units per hour, draw a slash through the one letter representing the correct response.

2. Qualitative -- draw a slash through the one letter representing the correct response.

10. Explain the division of the ornamental horticulture industry into 9 business areas and into functions within business areas (refer to list of business areas and functions.)

11. Explain that performance of tasks should be judged in terms of the task being performed by <u>some</u> person <u>within</u> the business area being interviewed.

12. Explain that the interpretation of task statements should be in terms of the function under which they are listed.

13. Request that any performed tasks not listed be written in and rated as to job conditions and performance level in the spaces provided at the end of each function. If more than two tasks need to be added, use the reverse side of the sheet and so indicate on the bottom of the second space.

14. Assist the interviewee in completing the rating of job conditions and performance level for several tasks until it is apparent he understands and is correctly recording his responses.

APPENDIX H

LIST OF MATERIALS TO TAKE ON THE ORNAMENTAL HORTICULTURE TASK ANALYSIS INTERVIEW TRIPS

List of Things to Take for Interviewing on Ornamental Horticulture Task Analysis Project

1. Interviewer's guide

2. Information copy of guide used by agents to recommend businesses for interview.

3. Print-outs for county where interviewing. These may be at Cornell for those counties where the lists of businesses for interview have been received from agents or in most counties it should be picked up from agents with the list of businesses recommended for interview.
   NOTE: These lists are confidential and need to be returned to W. Drake and A. Berkey.

4. Description of purposes of the study -- use trade journal announcements for this.

5. Directions to agents' offices in counties where the printouts and the lists of businesses for interview need to be picked up from agents.

6. Cover page and instruments for scheduled interviews and a complete set for use with secondary interviews.

7. Stamped, addressed (to A. Berkey at Cornell) envelope for use when an employer agrees to complete a business area for a secondary area at a later date and mail it in.

8. County map (obtain from agents)

9. No. 2 pencil for marking instrument

10. Pen to code instruments.
    NOTE: Be sure to precode or note county on instruments.

11. Coding key for instrument

12. Telephone credit card

13. Long clipboard for use in supporting instrument in cases where no table is available.

14. Map of New York State (normally in fleet car but you need one that can be marked on).

15. Letter of introduction on College of Agriculture letterhead.

16. Travel vouchers for recording expenses.

17. Tax exemption certificates for use to exempt tax on housing (not food)

18. Money for food and housing

19. Lists of businesses for interview. (Get from agents except in a few cases where these have already been turned in to Cornell.)

20. Travel regulations for Cornell. (Obtain from College Fleet Office in Roberts Hall.)

APPENDIX I

COPY OF COMPUTER PROGRAM USED TO CALCULATE A MODE

```
*JOB
      DIMENSION J(2660),I(2660,9),IA(2660)
      DATA I/23940*0/
      READ 1,NCASES,NVAR
    1 FORMAT (2I5)
      DO 10 IB=1,NCASES
      READ 100, (J(K),K=1,NVAR)
  100 FORMAT (15X,17I1,3X,2I1)
      DO 10 JB=1,NVAR
      IF (J(JB).EQ.0) GO TO 10
      I(JB,J(JB))=I(JB,J(JB))+1
   10 CONTINUE
      DO 11 JB=1,NVAR
      IA(JB)=1
      MAX=I(JB,1)
      DO 200 JA=2,6
      IF (MAX.LT.I(JB,JA)) GO TO 102
      GO TO 200
  102 MAX=I(JB,JA)
      IA(JB)=JA
  200 CONTINUE
   11 CONTINUE
      PRINT 20
   20 FORMAT (3X,'MODES'/3X,'C16   C17   C18   C19   C20   C21   C24   C
     *25   C26   C27   C28   C29   C30   C31   C32   C36   C37'/)
      PRINT 21, (IA(JB),JB=1,NVAR)
   21 FORMAT (19(5X,I1))
      STOP
      END
```